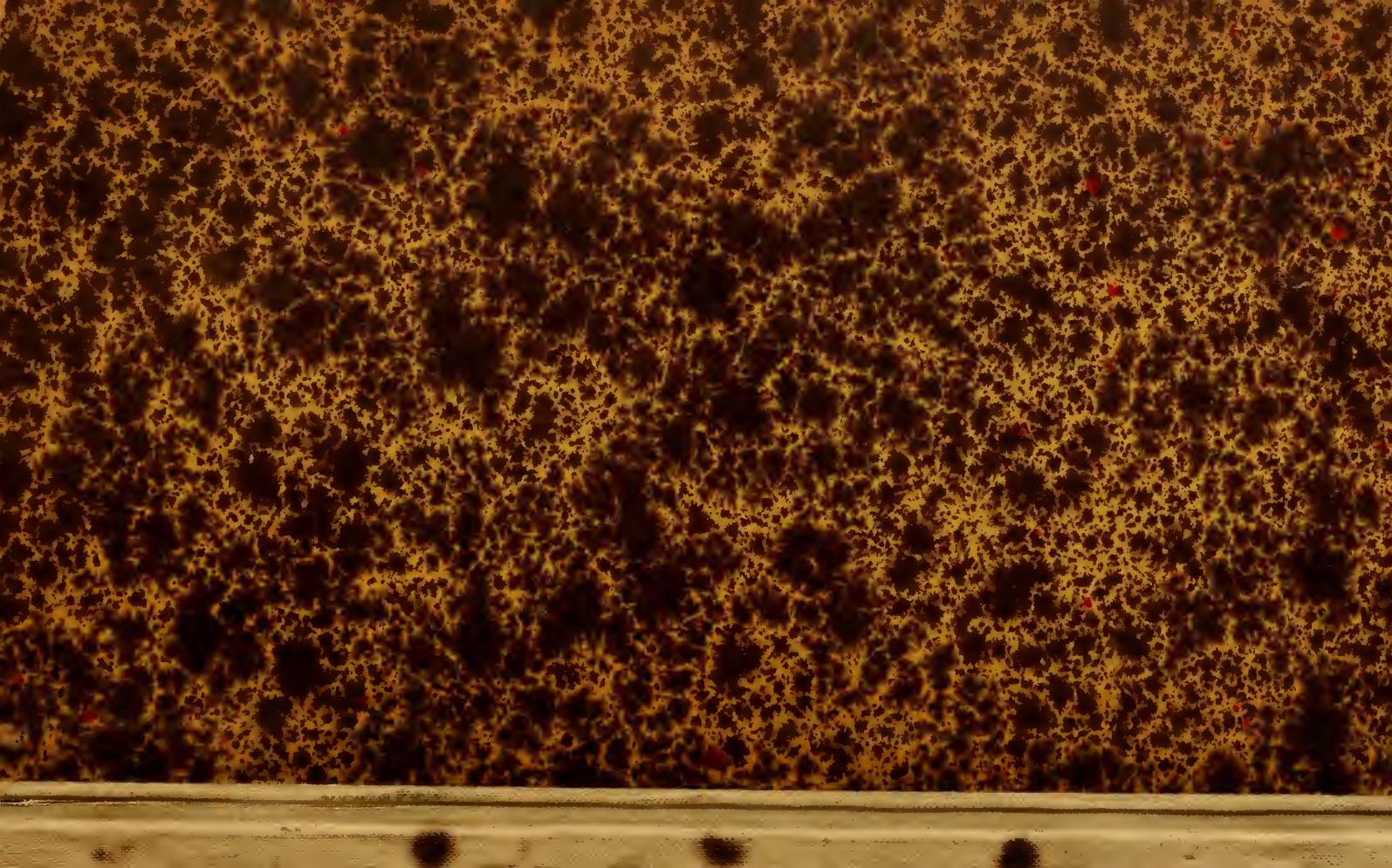

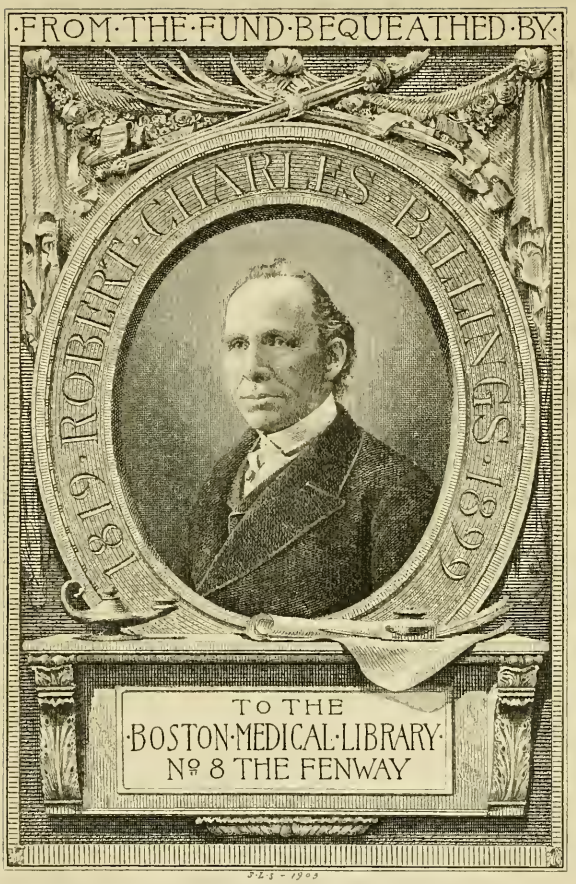
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ENQUIRY

INTO THE

NATURE AND EFFECTS

OF THE

NERVOUS INFLUENCE.

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ENQUIRY

INTO

THE NATURE AND EFFECTS

OF THE

NERVOUS INFLUENCE;

And its Connexion

WITH THE

VITAL, MORAL, AND INTELLECTUAL OPERATIONS.

A physiological, metaphysical, and moral Essay.

IN THREE PARTS.

PART I.

NATURE OF THE NERVOUS INFLUENCE AND ITS CONNEXION WITH THE VITAL OPERATIONS.

PART II.

ON THE CONNEXION OF THE NERVOUS INFLUENCE WITH THE INTELLECTUAL OPERATIONS.

PART III.

EFFECTS OF THE NERVOUS INFLUENCE ON THE MORAL AND INTELLECTUAL CHARACTER.

By Mrs Carleton

Paris:

ENGLISH AND AMERICAN LIBRARY, 55, RUE NEUVE-ST.-AUGUSTIN;

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1836.

NOTICE.

The marginal references having been inserted in the text as titles, by mistake of the printer, the reader must refer to the following list for the *real* titles of divisions and subdivisions.

PART I.

UPON THE NATURE OF THE NERVOUS INFLUENCE.

General distribution and functions of the Nerves.

On the Nature of the Nervous Influence.

PART II.

ON THE CONNECTION OF THE NERVOUS INFLUENCE WITH THE MENTAL OPERATIONS.

OF THE NERVOUS ACTION.

The Physical Sensations.

The Memory.

The Moral Sensations.

Volition.

INTELLECTUAL OPERATIONS.

The Perceptive Faculty.

The Judgment.

The Imagination.

The Will.

OBSERVATIONS.

Observations respecting the Formation of Ideas.

Observations on the Judgment

Observations on the Will.

Observations upon the dependence of the Immaterial Principle upon Matter

PART III.

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Effects of the Nervous Influence on the Character of Man

ARDENT TEMPERAMENT.

General Mental and Physical Characteristics.

The ardent Temperament combined with a weak Intellect.

Intellectual Characteristics.

The Feelings.

The ardent Temperament combined with a strong Intellect.

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OBSERVATIONS.

Parallel between the ardent and phlegmatic temperaments.

CONCLUSION.

N. B. It is requested that the Notes III and IV of the Appendix may be read in their proper places, viz. page 66.

ERRATA.

The Reader is particularly requested to refer to the errata, as those only which confuse the sense are here noticed.

Page 13, line 13, *for* last *read* least. Line 20, *for* affected *read* effected
17, — 5, *for* immediate *read* intermediate.
18, — 18, *read*—But the analogy that exists in their mode of operation is made evident from the painful sensations caused by internal irritation.
25, — 8, *for* uncharged *read* unchanged.
28, — 10, *for* respired *read* expired.
31, — 23, *for* febrine *read* fibrine.
32, — 16, *for* ? *read* ?
52, — 19, *for* vi- organ *read* visual organ.
56, — 16, *for* effect *read* affect.
57, — 23, *for* charged *read* changed.
57, — 14, *for* is to be deprived, *read* is found to be deprived.
[illegible], — 9, *for* directly to, *read* directly by
[illegible], — 1, *for* violent and irregular; as in insanity, *read* violent and irregular, as in insanity?
[illegible], — 13, *for* laxitive *read* laxity.
[illegible], — 20, *for* it is the power, *read* it is to the power.
[illegible], — 10, *for* yield that, *read* yield to the simple argument that.
[illegible], — 7, *for* motives *read* movements.
[illegible], — 10, *for* that animal, *read* that this animal.
[illegible], — 21, *read*—No dependence can be placed on the principle or affections: changeable in their direction as the waves of the watery element, without solidity, without a fixed foundation, the affections of a weak mind are at the mercy of every gale that blows.
[illegible], — 21, *for* plain phlegmatic, supposing, *read* plain phlegmatic, supposing.
[illegible], — 23, *for* reverse of those qualities to that, *read* reverse of these qualities? to that
[illegible], — 25, *for* existence *read* consistence

Dedication.

TO MY SON HENRY.

My dear Child,

It is not with the hope of giving you information, that I address this little work to you. The conjectures it contains may be true or false—but it is with the desire of directing your thoughts to pure and elevated objects, and of imparting the heavenly tranquillity which results from habits of contemplation, and the power of occasionally abstracting the attention from worldly cares, that I devote these pages to you. Do not however expect

this result, if your reflexions are not directed to a moral end, by an unshaken faith in the great truths of Religion. The human mind is too blind and feeble to wander, without a guide, in the dark regions of metaphysical speculation—if, like the French philosophers, you pervert this sublime study to an evil purpose, or, by subtle and fine-drawn arguments, reason away your belief in things moral and Divine—you will only reap anxiety, doubt, and perplexity; the state, of all others, most painful to the mind: but, if it serves to confirm you in your religious belief—if it displays to your view the worth and value of the immortal spiritual power that has been granted to you, and the imperious necessity of maintaining its dignity, by governing the inferior part of your nature with vigour and resolution—if it teaches you to controul your

feelings, and to consider the moral and physical sensations as the peculiar trials and temptations of the human state, and not, as in the brute, the guides and motives of the actions, then your soul will be at rest, your passions will be hushed, and your mind will be as bright and serene as an unclouded sky. Perhaps the circumstances under which I wrote part of this Essay, may give it some value in your eyes: firmly convinced that I had but a few months to live, I considered it as a Mother's legacy, in case my health should allow me to finish it—this occupation soothed me, and, by absorbing my thoughts, enabled me to retain the unalterable composure that probably contributed to my recovery. That you, my dear Child, may direct your wishes from the short-lived gratifications of this world, to the spiritual joys that, I hope, await

you in another; and that you may turn the tide of your affections from worldly objects to the Benignant Being who has conferred existence and innumerable blessings upon you, is the fervent wish of

YOUR AFFECTIONATE

MOTHER.

Paris, May, 1836.

PART I.

UPON THE

NATURE OF THE NERVOUS INFLUENCE,

AND

ITS CONNEXION

WITH

THE VITAL OPERATIONS.

ENQUIRY,

Etc., etc.

PART I.

NATURE OF THE NERVOUS INFLUENCE.

INTEREST AND IMPORTANCE OF THE SUBJECT.

The functions of the brain and nerves form the most interesting part of the animal economy—as obscure and wonderful as they are important, the mystery in which they are enveloped stimulates our curiosity; and the power of their influence over our whole nature, both moral and physical, gives a value to every fact connected with their operations. The movements of the animal frame; the execution of

the functions indispensable to life; the capability of thinking, of acting, and of feeling are all dependent upon the activity of the unknown principle that holds its mysterious empire in the brain and nerves. Here, it should seem, lies the internal spring which sets the whole animal machine in motion: the effects of its derangement are general, and the suspension of its action arrests not only the bodily but the mental functions. It is in the nervous system that we must seek the point of contact between the soul and the body, and it is probably to this source that the morbid affections of both must ultimately be traced. That it is always affected, either primarily or secondarily, when any of our functions are deranged, is very apparent; therefore, whatever can throw any new light upon this important class of operations, is likely to be of service in diminishing the moral and physical evils to which we are liable. I do not of course imagine that I can cast even a feeble ray across this mass of obscurity; but as the subject, in whatever manner it may be treated, can never be wholly devoid of interest, I shall

present the observations which I have noted down, during some years' attentive examination of my own internal phenomena, together with the various hypotheses which they have suggested. I shall begin by offering some conjectures upon the nature of the agent that is the immediate cause of motion and sensation, and I shall afterwards endeavour to trace the extent of its influence on the feelings and powers of the mind. The latter part of the subject will be independent of the former, therefore the prejudice that exists against the one need not operate against the other. I am aware of the ridicule that is attached to every voyage of discovery in the metaphysical world, particularly in search of a nervous agent, but the progress of knowledge has so long been favourable to my views, that I will at last venture to anticipate, by argument, what I hope may be hereafter affected by experiment.

GENERAL DISTRIBUTION AND FUNCTIONS OF THE NERVES.

The various functions of the nervous system, which shew themselves more numerous and

important, as they are more closely investigated, will appear more distinctly from a general view of the distribution of the nerves, wherein I have adopted the arrangement of an eminent *French* anatomist, because it is the most clear and systematic, and therefore the best suited to my purpose. (*See Appendix, Note* 1.)

DIVISION OF THE NERVOUS SYSTEM.

The nervous system may, generally speaking be divided into two parts: the one placed to a certain degree under the control of the mind, is its immediate agent, while it has at the same time some share in the performance of the vital functions. The other is appropriated exclusively to the purposes of life. The first, Bichat calls the nervous system of the *animal life* — it has the brain and spinal marrow for its centre, and its nerves pursue a direct course to the organs of sense, of locomotion and of the voice. The other, which he calls the nervous system of the *organic life*, is distributed to the organs of disgestion, circulation, secretion, respiration etc. Its nerves

are irregular in their course, and do not, like those of the former, correspond in two halves of the body. They have their centres in the *ganglia,* which are small bodies, perhaps convolutions of nerves, whose office is unknown. The *organic* is derived from the *animal* system, and perhaps the ganglia, placed along the spine and forming, with their communicating nervous branches, the great sympathetic, nerve, mark the respective boundary of each (*See Appendix, Note* 2). The nerves of the organic life are not under the influence of the will, neither do they transmit sensation, except when the sensibility of a part is highly exalted by irritation, and then we become sensible of their action*. One part of the *animal* nervous system is bestowed upon the internal organs, for what reason is unknown, as they are not under the influence of the will : this has suggested to me an hypothesis which will be explained in the chapter on the mental operations. The natural stimulus of

* The muscular system can, like the nervous, be divided into the animal and organic.

the nerves and muscles of the *animal life*, is the will; the natural stimulus of the nerves and muscles of the *organic life* consists of the fluids adapted to each organ, as the blood in the heart, the aliment in the stomach, etc.; but they are susceptible of excitation from other causes in both systems.

FUNCTIONS OF THE ANIMAL NERVOUS SYSTEM.

The office of the nervous system of the *animal life* is to minister to the mind, and to carry on certain of the functions indispensable to the continuance of life.

VOLITION AND SENSATION.

The connection of this part of the nervous system with the mind brings us to the very verge of the material world, and exhibits the most mysterious, as well as the most wonderful operations of our nature. Between the determination of the *will* and its visible effects on the *voluntary muscles*, an intermediate action takes place, and the operation of an interme-

diate agent is required. Between the percussion received by the *organs of sense* from external matter and the effects produced, thereby on the *mind,* an intermediate action is also required. It appears that, in both cases, this intermediate operation takes place in the brain and nerves, for, if the nerves of a voluntary muscle or of an organ of sense, be compressed or divided, the communication between the mind and the organ instantly ceases, and if the functions of the brain are interrupted, the communication between the mind and *all* these organs is immediately suspended; and it can no longer excite motion, nor become sensible of the action of external matter. We may therefore conclude that we *receive* and *produce* impressions, in short, that we hold communication with the external world, by means of some action that takes place in the nervous system.

INFLUENCE OF THE ANIMAL NERVES ON THE VITAL OPERATIONS

The action of the brain, and of the animal nerves has also a large share of influence on the vital functions : the latter contributes both to the production of animal heat and of chemical changes, and the death of the brain causes a cessation of the phenomena of respiration, and also a total annihilation of animal heat, which can no longer be evolved, even if the action of the heart and lungs be artificially prolonged.

FUNCTIONS OF THE ORGANIC NERVES.

The functions of the nerves of the *organic life* are very mysterious, and their action differs in many respects from that of the animal nerves.

But the analogy that exists in their mode of operation is made evident from the painful *sensations* caused by internal irritation, being similar in their nature to those conveyed by the nerves of the animal life.

ON THE NATURE OF THE NERVOUS INFLUENCE.

Having given this brief sketch of the distribution of the nerves in general, I will proceed to explain my notions respecting the *nature* of the nervous influence. It appears that the action which takes place in the nervous system is indispensable to the performance of the mental operations on the one hand, and of the vital operations on the other. Upon considering the subject, I can find no reason for supposing that a material agent is incapable of producing the phenomena attributable to nervous causes, and I am inclined to think that the advances made in chemistry, anatomy and physiology will, in time, enable us to explain the Arcanum without having recourse to a mysterious and unknown principle. The late discoveries in Chemistry have confirmed me in an opinion which I had previously entertained respecting the nature of this agent, and have enabled me to develope the following hypothesis, in which it will be

seen that I have ascribed the effects which it exhibits to a material cause.

The nerves are, in my opinion, the *vehicles* of the nervous power, and not the active agents in the nervous operations. It is acknowledged that the texture, the situation and the inelastic nature of the nerves does not afford any reasonable ground for attributing their effects to vibration or oscillation, and we can hardly ascribe such powers as they exhibit, to the soft and pulpy substance which composes their medulla. The substance of the brain is the same : in fact it is a prolongation of the spinal marrow; yet if the brain be irritated *directly* it causes no pain, because the irritation has not been first transmitted through the nerves— which confirms me in the opinion that the power of producing sensation does not reside in the nervous matter, but in some agent foreign to its substance. It is known that sensation is caused by some action continued along the course of a nerve, and transmitted through the brain to the mind, the co-operation of the brain being made evident by this circumstance, that if a nerve is divided, the

part beyond the division has no sensibility, while the part next the brain still conveys the impression, to the mind. The nature of this nervous action, and the existence of an agent foreign to the substance of the nerves, form the subject of this chapter. The nerves do not appear adapted to the reception or to the flux and reflux of fluids, as they are not hollow tubes: there is *one* fluid however, which requires no tube to contain it, which is subtle, powerful, and penetrating, and which produces effects on the *dead* muscle (as long as it retains its warmth) analogous to those which the nervous influence produces on the *living* muscle. This is the *electric fluid*, and though the notion that the nervous power is of an electric nature, has often been ridiculed, the progress of chemical knowledge seems to have increased, instead of having diminished, the probability of such an hypothesis, and a further insight into the mechanism and operations of the animal frame may shew us, that the powers which electricity is found to possess, can operate within the living body as well as upon dead matter; and that it is by

the most active, penetrating and powerful of all material agents, that the most wonderful and complicated work in the Creation is set in motion, while the direct action of the immaterial part is upon a substance so potent, subtle, and etherial, that we may consider it as it were, on the very confines of matter. We now find that electricity is not only capable of causing contraction in the muscles, but that it is indispensable to the production of heat and chemical changes; now all these operations necessarily take place in the animal body, and instantly cease in any organ in which the nervous action is interrupted. Heat cannot be produced without the aid of electricity, and the preservation of the vital principle depends upon the retention of some portion of heat in the animal body—its production is the last function that ceases, and if it be once totally extinct, no means can restore suspended animation.

SOURCE OF THE NERVOUS INFLUENCE.

The recent discoveries in chemistry to which

I have alluded above, have even shown us (in my apprehension) the very source whence we derive a constant supply of the nervous fluid. If it is a fluid, subject to exhaustion and renovation, it must necessarily be supplied from some source, which, to answer the desired purpose, must be constant, regular and inexhaustible. The discovery that electricity is naturally combined with *vital* air does, I think, give a clue to this arcanum: the conjecture that the subtle agent which carries on the animal and organic functions is contained in the pure, light, and elastic substance which we continually inspire, is not a mere supposition, but a conclusion which I have drawn from the phenomena exhibited in the act of respiration, from the effects resulting from the presence or absence of vital air in the blood, and from some other considerations which I shall mention.

VITAL AIR.

The importance of vital air is sufficiently ascertained by common experience, and its

name implies that it is indispensable to the continuance of life. That internal mysterious property which we call the *vital principle*, does not of itself appear capable of carrying on the vital operations, for when the material agents are removed, where is its power? The action of a constant *stimulus*, supplied by external matter, is evidently required for this purpose. When deprived of it, the animal machine ceases to exercise its functions and the vital principle becomes extinct. This stimulus is contained in the air we breathe: if respiration be arrested beyond a certain time, even in a body, the most perfectly organised, in the prime of life, and in all the glow of health, loss of sense and motion ensues and death inevitably follows.

EFFECTS OF VITAL AIR.

We find that the effects of vital air, are to impart certain properties to the blood, by which it is enabled to excite the muscles to contraction, to give sensibility to the nerves.*

* Sensibility is greatly dependent upon a sufficient

action to the brain, and due nourishment to the body: that it causes the production of animal heat, and that the blood which has not been subjected to its operation, carries debility and death to all the organs, and produces an instantaneous cessation of the function of the brain by its contact. These effects have been hitherto attributed to the *oxygenation* of the blood, in the act of respiration, because the air which is deprived of oxygen, cannot bring it into the state required for these purposes. I much doubt whether this principle alone would be capable of imparting such wonderful properties to the blood, even if it were carried into the system; but it is in fact expelled from the lungs, in the form of carbonic acid. Oxygen seems perfectly competent to the office of *purifying* the blood, by carrying off its superfluous carbon,* and

circulation of *arterial* blood to the extremities of the nerves, as well as to the brain. Those parts of the body through which red blood does not flow are possessed of little or no feeling, while, on the contrary, those that are extremely vascular are endowed with acute sensibility.

* Carbon exists in a greater proportion in blood than in organized animal matter; the blood therefore, after

this is doubtless necessary to prepare it for the office of nourishing the body; but the mere abstraction of carbon does not appear sufficient to qualify it for the purposes above enumerated: suppose the black blood to be unfit for the office of *nourishment*, the want of support does not occasion instantaneous death, which is the consequence when the uncharged fluid comes in contact with the brain. A sudden cessation of the animal functions is more likely to be caused by the loss of *excitation*; now the known properties of oxygen do not warrant the conclusion that it is capable of throwing the whole living machine into action, and the contact of oxygen with a muscle does not even excite or accelerate its contractions. If the direct application of oxygen to a muscle does not cause it to contract, nor even produce much inconvenience to the animal in the experiment, I do not see how the mere addition of oxygen to the blood should en-

supplying its various secretions, becomes loaded with an excess of carbon, which is carried off by respiration.—(Conversations on Chemistry, by Mrs. Marcet.)

able it to excite the muscles and to give sensibility to the nerves : in the act of *respiration* however, it appears that the contractions of the muscles are affected, and Dr. Huygens ascertained, that the pulse might be lowered or accelerated according to the quantity of oxygen inspired. Hence I should conclude that the organs of circulation are affected by something which the oxygen *conveys* in the act of respiration, and which is disengaged by the action of the lungs in that operation. Let us consider *what* is chemically combined with oxygen.

PRINCIPLE COMBINED WITH OXYGEN.

Sir Humphrey Davy has found, that the oxygen gaz which we inspire, owes its elasticity to *electricity*, with which it is combined: and that air which has lost its elasticity, is unfit either to support life, or to produce combustion : I am therefore inclined to believe, that both life and animal heat, are, like combustion, dependent upon the same agent which gives *elasticity* to the air, and

that oxygen is only the vehicle by which this powerful fluid, namely electricity, is conveyed into the system.

ARGUMENTS.

About ten cubic inches of oxygen are taken into the lungs at every inspiration, of which only *one eighth* disappears, and is converted partly into carbonic acid, and partly into water by its combination with the hydrogen of the blood : yet *the whole* of the air is respired in a state unfit for the support of life and combustion : the oxygen must therefore have lost in this inspiration, the principle to which it owes the power of supporting life and heat. This is electricity; and I conclude that while the oxygen is *expelled* from the lungs, the electricity is *retained.* Then how are we to account for the various effects attending an increase or diminution of the proportion of oxygen inspired, in medical experiments, when only a determined quantity, viz. a little more than one inch is changed in the lungs? —effects displayed in the acceleration of the

muscular action, the elevation of the spirits, and frequently the improvement of the health, when pure oxygen is administered medicinally—except by supposing that, although a certain portion only of oxygen is changed in the act of respiration, the electricity belonging to the *whole quantity* is disengaged, and that consequently the system receives different proportions of electricity, though not of oxygen: and that it is electricity, and not the oxygen, which affects the health and spirits? Indeed the effects are such as might naturally be expected to result from the action of electricity; the powers of the principle with which oxygen is combined, appear to me the best calculated for effecting the various purposes that are attributed to oxygen, because they produce analogous phenomena in other cases.

Before I quit this part of the subject, I will observe, that atmopheric air is found to contain the same proportions of oxygen and azote in every climate and in all parts of the globe. It seems, therefore, that although these proportions may be altered by chemical

means, in medical experiments, the air which we constantly respire contains the same quantity of oxygen, at all times: and yet nervous patients are more affected by the particular state of the atmosphere than by any other cause whatever. To what is this attributable? It is not to a variation in the quantity of oxygen, for there is not only a determinate portion of it changed in the lungs, but a determinate portion contained in the atmosphere: it must surely be to a cause which is *known* to be variable—viz. to the quantity of *electricity* present in the atmosphere.

CHANGE OF ELECTRICITY.

It might be objected that the action of so powerful an agent would be too violent for the animal frame—my notion is that like all the other elements thrown into the living body, it is there subjected to some change or modification that fits it for the human frame, and that it is changed into *animal* electricity or galvanism, which, as we know, acts upon both dead and living animal matter. The change may perhaps be effected in the *brain*

for the purposes of the *animal life*, and in the ganglia for the purposes of the *organic life*; and these organs may be glands appropriated to the important office of secreting the nervous fluid and accommodating it to the performance of the animal and organic functions. The ganglia have been supposed to serve the purpose of brains, and this I should think has some appearance of probability, for the nerves of the organic system diverge from these bodies, as the nerves of the animal system diverge from the brain.

CONDUCTORS OF THE ELECTRIC FLUID.

To these conjectures, I shall add, that as the blood contains the perfect conductors of electricity, viz. charcoal and iron, I think it not impossible, that it may in some manner be conducted by these to the different organs, or perhaps by the serum, which is, like the nerves, formed of albumen *.

* Blood contains seventy-eight-hundredths of water, seven-hundredths of albumen, fifteen-hundreths of febrine and colouring matter, and a small portion of

Oxygen is the only simple substance naturally combined with negative electricity; while all others are naturally combined with *positive* electricity. It is supposed that the union of the two electricities forms caloric, and it is in this phenomenon that I would seek an explanation of the production of animal heat. The union takes place when two substances form a chemical combination, and their opposite electricities are disengaged: in the act of respiration, may not the negative electricity contained in the oxygen which is inspired unite with the positive electricity contained in the venous blood, and produce the evolution of heat which takes places in the lungs? Indeed it is acknowledged that the operation of respiration is a kind of combustion. "Combustion is the rapid combination of a body with oxygen, attended by the disengagement of heat. The heat is produced by the union of the two electricities, which

unctuous matter, soda, peroxyd of iron, and various salts, viz. chlorate of sodium and potassium, alkaline sulphates, phosphates, and carbonates, carbonate of lime, magnesia, and iron.

are set at liberty in consequence of the oxygen combining with the combustible body." (*Conversations on Chemistry.*) "In *respiration*, a certain portion of oxygen combines with the carbon of the blood, and converts it into carbonic acid gaz." Every chemical union produces an evolution of heat, owing to the union of opposite electricities; therefore heat must surely be evolved, when the oxygen of the atmosphere combines with the carbon of the blood. If this heat were obtained merely from the caloric contained in the air, the temperature of the body could not be so equable, and the respiration must, I think, be sensibly affected during the night. This most important function is probably carried on by means less variable and uncertain; and it seems more likely that the animal heat is produced entirely by a chemical process. Although we may *feel* chilled by the inspiration of the night air, the temperature of the blood remains nearly at the same point, and respiration is as free and as regular in the night as in the day, and in the winter as in the summer season, provided the lungs are in their natural healthy state.

Not so if the air has lost its *elasticity*; which elasticity, it appears, is owing to the *electricity* which it contains: the breathing then becomes oppressed, and many unpleasant nervous sensations are the consequence of this state of the atmosphere: if it continues, disease and death may ensue. The union of the two electricities, causing an evolution of caloric, probably takes place in all the organs in which chemical changes are carried on, and indeed Bichat asserts that heat is produced in the general capillary system, as well as in the lungs*. In this manner we might easily account for the general diffusion of heat over the whole body. The evolution of heat which takes place in the *stomach* during digestion, and which is so necessary to the execution of

* The capillary system consists of the minute vessels which proceed from the extremities of the arteries; they form an essential component part of the several organs, and most of the important functions of organic life; as secretion, nutrition, exhalation, etc., take place in them. This system gives origin to the exhalants, the vessels which convey the materials of nutrition, etc.; and is a general reservoir, in which the red blood enters at one side, and the black blood, exhalations, secretions, etc., are sent out at the other.

this function, is perhaps caused by the union of the nervous fluid, if it *is* of an electric nature, with the opposite electricity contained in the aliment; and we cannot doubt that the nervous influence is employed in this operation: for it cannot be performed if the eighth pair of nerves, which goes to this organ, is divided. It may also have a share in the chemical changes which take place in digestion as well as in all the organs of secretion, for the *chemical combination* of different substances is partly effected by the union of their opposite electricities. Thus we find that the properties of electricity are calculated for the performance of all the principal operations of the living body; viz. chemical change, muscular motion, and the production of *heat*, which is as indispensable to the maintenance of life as the nervous influence itself; for, without heat, the vital functions cannot commence; and when the power of producing it is entirely lost in the body, life is irrecoverably gone.*

* All the means used for the restoration of suspended animation (besides external warmth) as artificial respira-

MYSTERIOUS AGENT OF THE ANIMAL AND ORGANIC LIVES, PROBABLY THE SAME.

Hitherto I have only enquired into the possible connexion of the electric power with the functions of the *organic* life, and suggested the probability of its being separated from the vital air by the action of the lungs, conducted by the blood secreted in the ganglia, and employed in the production of chemical changes in the secreting organs, and in the evolution of heat in the whole organic system.

So far it would only be concerned in the performance of the *vital* functions; but if it could be proved that the *organic* life is maintained by this agent, it would not, I think, be difficult to trace the functions of the *animal* life to the same source also. When we con-

tion, galvanism, friction, etc., tend to the recovery of *heat*. I have read a case in which the application of uniform heat *alone* revived the patient, after a long immersion in the water—a young girl was completely covered with hot ashes, and a cap filled with them put upon her head, and she recovered in a few hours, so completely, that no unpleasant feeling remained, except a degree of lassitude.

sider the close connexion and the resemblance of many of the phenomena in the animal and organic nervous systems; that they are rather divisions of the same than distinct systems; that muscular motion, heat, and chemical changes are produced by the operation of both;* and that nature is never prodigal in her *means* of action, it will appear probable that the same agent operates in both. I think that the nervous fluid of the animal system may perhaps be secreted in the *brain*, which, among its other important functions, may serve as a gland for this purpose. Whether electricity, if such it be, undergoes any change or not, in this organ, is of no consequence to the points under present discussion—the object of enquiry is, whether the same agent, derived from the same source, viz. vital air, operates in both divisions of the nervous and muscular system. It must be allowed that the *causes* which excite muscular contraction, in the two systems, are not the

* The nerves of the animal life have some influence in the production of animal heat, for the ligature of a nerve causes a general sense of cold in the limb.

same; being material stimuli in the organic nervous system, and the operation of the will in the animal nervous system; but it does not follow that the *agent* which is called into action must be different, and, indeed, though the brain obeys the impulse of the mind, its excitement by *material* causes can produce muscular motion also, as when pressure or irritation of the organ brings on convulsions.

SHARE TAKEN BY THE BRAIN IN THE ORGANIC FUNCTIONS.

Neither is the office of this organ limited to the functions of volition and sensation—it has some share in those of the organic as well as of the animal life. It is ascertained that the production of animal *heat* is very much influenced by the brain; when it ceases to exercise its functions, the animal loses the power of producing heat, even when the action of the heart and lungs are continued by artificial means. The brain also contributes to the production of chemical changes, for the operation of digestion cannot proceed, when its

communication with the stomach is intercepted. It is to be remarked that in this case the power of electricity can supply its place, and the requisite change in the aliment can be effected by *galvanism*.

OPERATION OF THE ELECTRIC FLUID IN THE ANIMAL LIFE.

If the electric fluid conducted by the blood causes contraction in the muscles, and sensibility in the nerves of the *organic* life, I should think it probable that it is the agent of the mind in the production of motion and sensation in the *animal* life, especially as the circulation of *red* blood to the extremities of the animal nerves is found indispensable to their sensibility. I should suppose that, in the operation of voluntary motion, the mind excites the electricity of the *brain*, which is from thence transmitted along the nerves to the voluntary muscle in which it excites contraction, and that in sensation, the contact of objects of sense excites the electric action of the *nerves of the senses*, from whence it is conducted to the brain.

SHARE TAKEN BY THE NERVOUS INFUENCE IN THE EXCITATION OF IDEAS.

I also believe that it has a considerable share in the operation of forming ideas, in which the action of the brain is evidently indispensable. The muscular energy and mental powers are so intimately connected in the animal economy, that this, with other reasons, inclines me to believe that the same material agent is employed in the operation of each. "If the body has been fatigued, the mind cannot exert its powers of attention, memory, and judgment with alacrity: a student in mathematics would be unable to trace the steps of an intricate problem after having contended in an athletic game, and we cannot think much and use strong exercice at the same time; these powers seem therefore to depend alike on the nervous energy, and the simultaneous diminution of both implies the diminished state of that energy,"* the nerves of

* The passages between inverted commas are quoted from Bichat's Physiological Works, translated by Lawrence.

the senses also require repose, as well as those of the voluntary muscles, and it seems as if the supply of the nervous fluid was exhausted in both after a certain degree of exertion.

SUCCESSION OF IDEAS.

Perhaps the regular secretion, and the continual excitation which the nervous fluid gives to the brain, are the reasons that the ideas succeed each other without intermission; and this constant succession probably never ceases while the brain is in a state of activity. The ideas may continue during sleep, though they do not always make a sufficient impression to recur to the memory when we are awake: when they do, we know we have *dreamt*.

THE VOICE.

A portion of the fluid must also be bestowed upon the vocal organs, probably a superabundant secretion of it produces loquacity. We may observe that a morbid increase of the nervous action frequently produces an extraor-

dinary volubility of tongue; thus it sometimes precedes madness, fits of different kinds, etc., and accompanies anger—every one has experienced the relief that scolding gives in this case, probably by giving a vent to the superabundant nervous fluid.

RECAPITULATION.

To conclude.—I believe that the nervous fluid of the animal life carries on—1st, the functions of volition and sensation; 2d, such of the mental operations as require the aid of a material agent, as the formation of ideas; and 3d, some of the organic functions, such as the production of animal heat, and of chemical changes.

ELECTRICTY AND GALVANISM.

I cannot help fancying that the different effects produced by electricity, in carrying on life in the one system, and sensation and volition in the other, bear some analogy to the different actions of the voltaic battery and the electric machine; in the first, a copious and

regular supply of electricity is obtained for chemical purposes; while the latter, whose action is only required occasionally, causes motion and sensation by the superior rapidity and intensity of the charge. However, I believe the nervous fluid of the animal as well as of the organic life to be *galvanic*; it is by galvanism that all the voluntary motions of the muscles may be imitated in the dead subject and it is a stimulus which will cause contraction after all other stimuli have ceased to operate upon them. According to Bichat's experiments, it does not seem to have any effect upon the involuntary muscles; but in this department of the living economy, the action of which is very obscure, some peculiar mode of operation unknown to us may be required in the experiment, and the fluid ought perhaps to undergo some change in the organic system, of which we are ignorant. However, Dr. Fowler and Mr. Humboldt deny that galvanism has no effect on the organic muscles.

EXHAUSTION AND RENOVATION OF THE NERVOUS FLUID.

The nature of the nervous phenomena shews, I think distinctly, the exhaustion and renovation of a material agent. The property of animal sensibility is exhausted by repeated excitement in experiments, and is renewed after some interval of rest: the power of moving the voluntary muscles is exhausted by exercise, and again renewed by repose. Now, I cannot refer this exhaustion to the organ thus excited, because those which are under the influence of a perpetual stimulus are never fatigued, and the heart, which is incessantly stimulated by the blood, continues to contract during the longer or shorter period of our lives without requiring repose: I should rather suppose that it is the agent which *excites* the brain to sensation and the muscle to contraction, that is liable to exhaustion, not the power of *answering* to the excitation. Bichat observes, that when one of the organs of the organic life is in action, the others are usually in a state of

repose, as if one part could not be excited unusually without a corresponding diminution in the rest, and that there was a determinate quantity of vital power for the whole.*

To this we may add that in nervous diseases, the irritation sometimes leaves one organ without any apparent cause, to fall suddenly upon another; in my opinion this has more the appearance of an increase and diminution of an exciting cause or nervous fluid, than of a vital power. If the stimulant of food, for example, produce a flow of nervous fluid into the stomach, and that its quantity in other parts is diminished in consequence, the fact seems to me simple and intelligible; but a diminution or increase of *vital power* in any part, is not easily accounted for, and I should think could only be the consequence of a diseased or healthy state of the organ. The digestive apparatus is so artfully contrived, that the presence of the aliments calls forth the fluids required for its digestion — thus the pres-

* The digestive apparatus is adapted to this arrangement.

sure of the full stomach produces a flow of bile from the liver just at the time that it is wanted—may not the excitation given to the nerves of the stomach by the contact of the food, with similar art, draw a flow of nervous fluid to that organ?

FATIGUE.

Every impression, whether moral or physical, which the nerves receive, may increase the flow of the nervous fluid at the time without causing that exhaustion, which produces the sensation of *fatigue*, so long as it is neither too frequent, too violent, nor too long continued; because in a proper state of health, it is constantly renewed in such proportion as to be adequate to the general purposes of life and of mental action, and probably the hours devoted to sleep are sufficient for its renovation. Physical pain appears to me to *drain* the nervous system of the fluid which fulfils so many important purposes, and to diminish the general strength, by the exhaustion consequent upon its immoderate flow. As long

as the increased secretion continues, the powers of life are still preserved, but as soon as the supply is exhausted, death, or at least syncope, must ensue. In most cases, as in fevers, convulsions, etc. a morbid and irregular increase of nervous action, followed by exhaustion is sufficiently apparent. The mental action has a strong and evident influence in causing excitation and consequent diminution of the nervous power. This effect is very evident when the brain has been too much excited by the exercise of the mental falcuties and when the frame has been agitated by the passions of the mind. Both these causes will ultimately produce diseases in the organic system, which always bear a nervous character in the beginning.* I believe that in some cases, the exertion of a vigorous mind can diminish the violence of their attacks as far as the nervous action is concerned in them, by regulating the action of the brain to a certain degree, and I believe we are not aware of the

* The organs affected in this case are the lungs, the stomach, and the liver; for which a reason will be found in my hypothesis of the Feelings of the Mind.

full extent of the mental over the physical powers when opposed to physical evil.

MODE IN WHICH THE NERVOUS FLUID IS PRODUCED.

With respect to the manner in which the electric action may be excited in the brain, I have formed the following conjecture. Electricity may be excited by contact, pressure or friction—now may not the regular and constant *motion* of the brain, which is supposed to be essential to the performance of its functions, have some connection with the excitation of the nervous fluid?* It seems that the impulse which this organ receives from the arterial blood, is thought necessary to maintain it in a state of activity, to enable it to operate in sensation and volition, and that this mechanical motion is as indispensable to its functions as the peculiar chemical properties of the red blood. Perhaps it is this regular and

* Bichat supposes that this motion arises from the great arterial trunks being placed at the basis of the brain, between the latter organ and the bone. As their distension is resisted by the skull below, it elevates the brain at every pulsation.

incessant friction, which obliges the production of ideas to be constant and without intermission, for we find that the will can only direct and select them, but cannot prevent their formation.

MOTION OF THE ARTERIES.

The continual action of the nervous fluid must be required in every part of the organic system: perhaps it is excited, not only in the brain but in the whole of the nervous system, by the same means: viz. constant percussion, which percussion is occasioned by the arterial pulsations. "The smaller divisions of the arteries run into the interior of our organs, without however entering into their internal structure: thus in the muscles they pass between the fibres; in the brain, between the convolutions; in the glands between the lobes of which they consist, etc. By these" says Bichat, "an intestine motion is communicated to the whole organ, which facilitates its functions, and keeps up the activity of its various parts. The sudden cessation of life, when the blood

ceases to agitate the brain, proves the immediate connection between this intestine motion and its active powers. Hence we observe that the vital energies are more decidedly marked in all parts where the arteries are very numerous, as in the muscles; while on the contrary, the vital phenomena are much more obscure in organs of less vascularity, as the tendons, cartilages, bones and other white parts." Now the nerves generally follow the arteries; they frequently enclose them as with a net work, and in some parts form almost an acessory covering to them—but the action of the nerves in the organic system is unknown, and the reason of this arrangement is not discovered: may they not have a reciprocal influence upon each other, the operation of the fluid derived from the nerves, exciting the action of the arteries and the continual shock given by the arterial pulsations exciting the action of the nervous fluid? This double arrangement would be very consistent with the other economical contrivances of nature.

DESULTORY FACTS.

I will in this place mention a few unconnected facts which appear favourable to my hypothesis, respecting the identity of the nervous and electric fluids, and may therefore be thrown into the balance, though I cannot regard them in the light of proofs.

A moistened surface exalts the electric energy—in all the organs of sense a moist membrane is interposed between the nerve and the body which is to act upon it.

An elevation of the temperature is required to exalt the electric energy, a certain degree of heat is indispensable to the contraction of the living muscle.

The powers of galvanism as well as of pure oxygen, have been tried with success in cases of suffocation.

The organs of the electric eel have numerous and remarkably large nerves.

I can state, from personal experience, that the *start* produced by a sudden and violent noise, is frequently accompanied by a sensa-

tion similar to a smart shock of electricity in its nature and duration, and in the part affected, which is the diaphragm.

In galvanic experiments, the application of metals to the organs of sense produces, in each organ, the peculiar sensation for which it is constructed, as taste in the tongue, light in the eye, etc.: so when nerves intended merely for muscular motion are subjected to the action of galvanism, the effect produced is motion in the muscles on which they are distributed.

Perhaps the flash of light which darts across the eyes upon receiving a smart blow either upon the skull or on the eye, may be an electric spark, and a blow or shock of any kind may excite it in any part of the frame, though it will be *unseen* and consequently unknown, unless it passes, as in this case, across the vi- organ.

FACTS EXPLAINED BY THE HYPOTHESIS.

The identity of the electric and nervous fluid might also account for other facts.—As

for example the remarkable effect which different states of the atmosphere have upon the health and spirits, and even on the clearness and rapidity of the ideas. I have already mentioned, that the atmosphere naturally contains the same proportion of *oxygen* all over the globe (viz. 28 parts of oxygen out of 100 of atmospheric air), and though it is diminished and consumed, when confined and applied to particular purposes, it is not, in its free state, affected by climate, weather, etc.

EFFECTS OF THE ELECTRICITY OF THE ATMOSPHERE.

But it is not so with *electricity*, and the air contains much more of this principle at one time than at another. The langour, the drowsiness, the debility and relaxation, and the slowness of circulation which we often attribute to the quality of the air and the state of the weather, may therefore be more reasonably referred to a diminished portion of electricity than of oxygen in the atmosphere;

while the general irritability of the system from which we sometimes suffer, without any apparent cause, may be attributable to an opposite state of the air, probably also the union of the two electricities in their proper proportions, may have some effect upon the animal frame; many sensations seem to shew that the positive electricity which remains uncombined and ever varying in the atmosphere, has some peculiar effect upon the animal muscles. (The electricity that is naturally combined with oxygen, and that is disengaged in the lungs, is *negative*.) Cavalho has observed: "1st, That there is in the atmosphere, at all times, a quantity of electricity; 2d, That the uncombined electricity of the atmosphere, or fogs, is always of the same kind, namely positive; 3d, That the strongest electricity is observed in thick fogs, and also in frosty weather, and the weakest when it is cloudy, warm and very near raining—but it does not seem to be less by night, than in the day time; 4th, That in a more elevated place the electricity is stronger, than in a lower one." Now

I can state from my own experience that, in the warm cloudy weather above mentioned, and also in low situations (where by this account the air contains but little electricity) the state of langour and inaction is quite distressing, and that in frosty weather and in elevated situations, a new impulse seems to be given to the whole system.

EFFECTS OF CLIMATE ON THE HEALTH.

Perhaps the diminution of electrity in warm wet weather, might account for the sudden effect which the rains in Africa had upon Mungo Park's soldiers, who fell ill in a few minutes after they had begun. The wet season on the coast of Malabar, shews its effects on the *nerves*, which it even paralyzes to a certain degree, and the complaint is cured by changing the air, and crossing the Baleghaut mountains. The drowsiness induced by passing the Pontine marshes, may be attributable to the same cause, and also the malignant fevers produced by the *malaria* in some parts of Italy,

which, it must be remarked is peculiarly soft and mild. It is probably owing to the quantity of electricity which the air of France contains, that it owes its remarkable elasticity and consequent salubrity. At the same time, a superabundent portion may excite the system too strongly, and cause the feverishness and other distressing feelings experienced by those who ascend into very elevated regions, and which are so fully described by Saussure, in the account of his Journey to the summit of Mont Blanc.

DIEFERENT EFFECTS OF THE TWO ELECTRICITIES.

I must here notice an apparent inconsistency, which admits of explanation. I have ascribed the *regular* and *equable* diffusion of animal heat to electricity, while I have at the same time attributed the *unequal* excitation of the nerves to the action of the same principle; it will, perhaps, be objected that the difference observable in the electrical state of the air, ought to effect one operation as well as the

other; but it must be recollected, that the evolution of heat in the lungs, is supposed to take place in consequence of the chemical union of the cubic inch of oxygen contained in the atmospheric air we inspire, and the carbon present in the blood, by which their opposite electricities are set at liberty: this is a chemical operation, performed with regularity by a small and determinate portion of oxygen: the irregularities in the nervous action above enumerated, I attribute to the *free* and *uncombined* electricity of the atmosphere, which I believe to be also carried into the system, because the *whole* bulk of the air we inspire is found to be deprived of its elastic principle in the lungs. This agent therefore differs from the other in its function, its mode of operation in the lungs, and also in its quantity and quality, for it is contained in about 40 inches of atmospheric air which we take in at every inspiration, and it is sometimes positive and sometimes negative; whereas the electricity combined with the 1 1/4 cubic inch of oxygen charged in this organ, is always negative. The evolution of

animal heat, however, though generally regular, is certainly liable to variation from different causes, and the state of the secretions is more or less influenced by the quality of the air, particularly in nervous subjects. The functions which appear to be the most sensibly affected by the electric state of the air, are the *digestive*, and certain of the mental functions. —an association which will not excite so much surprise, when we recollect that the brain is concerned in both : besides, the personal experience of every dispeptic patient can testify that the morbid state of the stomach affects the performance of the mental operations. I therefore conclude that the organ directly affected by the free electricity of the atmosphere, is the brain, and that through this medium, every operation in which the nerves are concerned, and *as far* as they are concerned, is subject to the influence of the climate, wind *, humidity,

* The east wind has a peculiar effect upon the nerves, which appears to be of an irritating nature. I have invariably observed, that the sensations it occasions are distressing in proportion to the irritability of the system. In coughs, particularly of the spasmodic kind, it fre-

etc., this influence being most strongly felt in the organs which receives cerebral nerves, in individuals of a weak or irritable nervous system and in those whose organs have been weakened by any chronic morbid affections. On this subject I shall have occasion to make some further observation in the next chapter.

DISEASE.

If, as I believe, the chemical, mechanical, and mental functions are in a certain degree carried on by means of a nervous fluid, it is not improbable that the greatest number of our diseases may proceed from an inordinate, deficient, or irregular secretion of this important fluid, and the discovery of its nature would consequently be a valuable acquisition to the medical department. — We should perhaps find in this case, that most diseases

quently causes a relapse. A damp easterly wind is sufficient to give the croup to children who are exposed to the pernicious blast.

have their origin in the over-excitement of the nervous system, either in the brain, producing that general affection of the nervous system called *fever*, or in the nerves producing local affections : and this over-excitement would naturally be followed by loss of power, in consequence of the exhaustion of the nervous fluid. Loss of power must be the natural consequence of over-excitement, and even the operation of most narcotics must result from previous over-excitation. We must except the effect produced by the application of azotic gaz to the nerves and muscles, which seems to strike them with sudden atony, and consequently causes *instant* death. The peculiar effect of this gaz, confirms an opinion I had formed, that one of the purposes of azote is to dilute and moderate the activity of the vital air we inhale : in order to adapt it to this end, its properties must be of an opposite nature. The cause of the phenomena of fever is unknown, but their nature seems, I think, to indicate that they originate in the brain. In fever, the functions in which the brain is most concerned, seem to be chiefly affected.—The

action of the voluntary muscles, of the nerves of the senses, of the stomach, and particularly the production of animal heat are all deranged, and when the violence of the symptoms increases to a certain heighth, the association of the ideas is changed, and delirium ensues : this occurs when there is no inflammation or organic disease in the head. I should therefore suspect that the phenomena of fever are caused by an irregularity in the action of the brain, of temporary duration, proceeding from some derangement in the secretion of the nervous fluid—a derangement in the secretory action of any large gland, as the liver for example, produces a general affection of the system.—If the brain performs an office of this nature and secretes the fluid which is the most important and universal in its operation in the whole animal economy, how much more violent and general must be the consequence of any irregularity in the functions of this organ !

INSANITY.

With respect to insanity, delirium, and the temporary madness produced by the abuse of spirituous liquors, and the violence of passion; I would attribute all such effects to the same cause — namely an immoderate secretion of the nervous fluid in the brain. If these phenomena could be traced to a physical cause, without having recourse to a morbid action of the *spiritual* part of our nature by way of explanation, the solution of this difficulty would be more satisfactory, for a disease of the immaterial principle appears more mysterious and improbable, than a derangement of the cerebral action. It must be allowed that the judgment is affected, but this may perhaps be accounted for without supposing any alteration in the state of the immaterial principle, as I will endeavour to shew in the chapter on the mental operations,

CONNEXION OF THE MAGNETISM OF THE EARTH WITH NERVOUS DISEASES.

As some connexion exists (the nature of which has not yet been precisely ascertained) between electricity and magnetism, I shall mention a few observations upon the latter which have led me to suspect some relation between the magnetism of the earth, and the nervous action of the animal body; a relation much more apparent in its morbid, than in its healthy state. I am inclined to think that the various nervous states of the body at different periods of the 24 hours, are connected with the variations in the magnetic force of the earth at such times. It has been ascertained by Professor Hanstein, that the magnetic intensity of the earth is subject to a diurnal variation, decreasing from day break till 10 or 11 o'clock A.M. when it reaches its *minimum*, and from thence it increases until it reaches its *maximum* about 3 o'clock A.M.

Now I have observed that morbid affections which arise from *too great* an irritability in the system, as catarrh, fever, etc., increases in vio-

lence towards the time that this magnetism is rising to its maximum, and this period being passed, viz. 3 o'clock A.M., sleep and perspiration will succeed to the heat and restlessness of the first part of the night. I have also observed that in some complaints arising from languor and a *deficiency* of nervous action, the distressing feelings produced by it have been most apparent when the magnetism was at its minimum and that the strength and spirits have risen when it was advancing to its maximum, after which the inclination to drowsiness has returned. These facts I have noticed in some very marked cases for months together. The increased rapidity of the circulation and development of heat towards evening, cannot I should think be attributable to the state of the digestive organs after a full or late meal, for it takes place independently of this circumstance, both in the healthy and feverish state, and in the latter, the little nourishment which is taken is frequently not greater in quantity at one period of the day than the other*.

* The influence of magnetism seemed to me to derive

CONCLUSIONS DRAWN FROM THE ABOVE.

The last mentioned observations afford, in my opinion, an additional proof that animal heat is not produced by the evolution of *atmospheric* heat in the lungs, during the act of respiration, for the temperature of the atmosphere is lower during the night than in the day, and yet we find that animal heat increases instead of diminishing, towards that time: it is therefore probable that its formation depends upon a less variable cause.

Such are the facts and observations which have decided my opinion respecting the nature and existence of a nervous fluid and its identity with galvanism : they would probably have been more numerous, if my information

confirmation from the course taken by the cholera in 1831, which took a north-west direction from the shores of the Indian Ocean to the North magnetic Pole (the exact situation of which has been discovered by Captain Parry) and which had the appearance of being carried in *currents,* owing to some mysterious cause, either in the air or in the earth. May not this cause have been electric or magnetic?

with respect to facts, had not been drawn from authors decidedly hostile to any hypothesis of the kind. In the course of my research, I found that when galvanism was first discovered, its connection with the nervous action was suspected, and that the notion had been afterwards rejected.— But the nature and powers of the electric fluid were not at that time so well known, and though they are not yet fully ascertained, the progress of knowledge in this respect affords more rational grounds for the adoption of the opinion I have stated. I shall await its confirmation or confutation, and now, I shall endeavour (without referring to the particular nature of the nervous action) to trace its connection and dependance upon the *mental* action. For this purpose I have diligently perused my own mind without the assistance of any other methaphysical book, both in order to develop my hypothesis unbiassed by the opinion of others, and to exercise my own faculties, by the habit of abstraction and intense thought which such a plan required. *(See Appendix, Note 3.)*

PART II.

ON THE

CONNEXION OF THE NERVOUS INFLUENCE

WITH

THE MENTAL OPERATIONS.

PART II.

INFLUENCE OF MATTER IN THE MENTAL OPERATIONS.

The material part of our nature is, in my belief, more deeply concerned in the operations of the mind than is generally supposed. As far as I can discern, its influence is extensive and important, and even indispensable to the performance of the mental functions, at least during our present mode of existence. Its nature and degree are therefore subjects worth the closest investigation, as some further insight into the philosophy of the human mind might possibly be obtained, by tracing its phenomena *through* those of the material part, instead of considering its powers, independently of any material action.

APPARENT NECESSITY OF TWO PRINCIPLES.

An attentive examination of the phenomena of my own mind, has let me to conclude, that

the action of two principles is required in all its operations.—One, dignified in its nature, unknown in its essence, characterized by the three general powers of *feeling*, *willing*, and *understanding:* the other subservient to the former, constituting the materials upon which it acts, and the tools by which it operates, and possessing at the same time the capability of acting upon and influencing it to a certain degree.

MUTUAL DEPENDENCE OF THE TWO PRINCIPLES—DEPENDENCE OF SPIRIT UPON MATTER.

The two principles are therefore dependent upon each other, in certain respects.

The present dependence of the immaterial principle of man upon matter, is made evident by the phenomena which the human constitution exhibits, and chiefly by the total cessation of the mental operations when the functions of its material organs are interrupted, as in syncope, and in every case of suspended animation. If a single act of the intelligent power could be performed during this state, we might infer that it was, so far at least, in-

dependent of matter, but even its consciousness of existence is lost, and though the soul still continues to exist, it is incapable of operating, as a workman necessarily remains inactive when he is destitute both of tools and materials. Thus we cease to see when we are left in darkness, not because the faculty of seeing is destroyed, but because the means by which we use it are wanting. This fact does not therefore afford any reason for supposing that the immaterial principle remains *extinct* when the functions of the brain are permanently arrested in death; for the possibilility of an *unconscious* existence in certain circumstances is proved by its taking place during life.

DEPENDENCE OF MATTER UPON SPIRIT.

The entire and necessary dependence of matter upon spirit, is made evident by the inertness (among other reasons) which is one of its characteristic properties, for as it can neither commence nor direct its own motion, it must owe the capability of executing *any* operation to a will that can impel it, and an intelligence that can direct it.

LIMITS OF OUR SPIRITUAL POWER OVER MATTER.

The power which has been granted to our immaterial principle over matter, is, however, partial and limited, for we are incapable of giving existence, powers or properties to a single atom. Our influence is confined to the production of *change* and *motion* in surrounding matter (in this I include, not only the excitation and direction of mechanical and muscular motion, but the excitation of the mind's material agent—that is, the brain—to the performance of the mental operations): but however narrow may be its sphere of action, our immaterial principle displays the attributes of a *spiritual nature*, viz. a will to *impel* and *call forth*, and an intelligence to *direct* both mental and material operations.

MATERIAL ORGAN OF THE MIND.

It appears that the material agent upon which the mind *directly* operates, is the brain, or ra-

ther (in my opinion) a subtle and mobile fluid, of an electric nature, of which the brain and nerves are the conductors. But this hypothesis, as I have before mentioned, is independent of any other which I may propose in the course of the Essay. It is only my intention to trace the *effects* of the nervous influence upon the mind, taking it for granted that it exists, without refering to its nature, further than that I believe it to be material. All of which we can be certain is, that it consists of some action which takes place in the brain and nerves, and that when their functions are interrupted, our spiritual part loses the capability of communicating with the external world, being unable either to produce motion or to receive an impression.

MYSTERIOUS NATURE OF THE NERVOUS INFLUENCE.

I am inclined to think, that the means by which these operations are performed, may perhaps be within the reach of our knowledge, and be developped when the sciences of ana-

tomy, physiology and chemistry, shall have arrived at a greater degree of perfection—but with respect to the *direct* action of the immaterial principle upon matter, i. e. upon the nervous fluid or whatever it may be, I have no doubt that it will remain unknown as long as our faculties are restricted within their present limits. Perhaps indeed there may be no secret to discover in this ultimate operation, and the fact may be simply, that when the will decides, it is so *ordained*, that the matter allotted to its purposes should move in consequence: by which matter, I must not be understood to mean the *muscles*, but a more direct and immediate agent of the mind which acts *upon* the muscles, viz. the nervous fluid.

LIMITS OF THE CEREBRAL AND INTELLECTUAL ACTIONS.

I shall now endeavour to trace the respective limits of the cerebral and intellectual actions, and their mutual dependance upon each other, first observing, that no phrase which I use is to be construed into an assertion,

and that this chapter contains merely a statement, of what *appears* to me to take place in the mind.

The share which the material principle takes in the mental operations, is to produce *impressions* upon the immaterial principle, and to *obey its impulse and direction.*

The part of the immaterial principle is to *feel* the impressions made by the means of the *sentient power,* to *perceive* and to *judge* of their nature and relations by means of the powers of the *understanding*, and to produce *impressions* upon matter by the power of the *will.* The immaterial principle therefore is both active and passive, for it both receives and produces impressions.

The action of the two principles will be next considered under two distinct heads, though it is not possible to separate them *entirely*, as neither can operate without the assistance of the other. The first section will treat of the *material or nervous power*; the second, of the powers of the immaterial principle. Under the first head I shall place the physical sensations, the ideas, the moral sensations or

feelings of the mind, and volition, by which I mean the executive power of the will: under the second, the perceptive faculty, the judgment, the imagination, and the will.

OF THE NERVOUS ACTION.

The part of the nervous system under present consideration consists exclusively of the nervous system of the animal life, that is, of the brain, and the cerebral and spinal nerves.

FOUR NERVOUS ACTIONS.

There are, it appears to me, four different nervous actions concerned in the operations of the mind: two which take place from the nerves to the brain; one is confined to the brain alone, and one takes place from the brain to the nerves. The two which take place from the nerves to the brain act *upon* the mind, and produce the physical and the moral sensations. The one which is confined to the brain co-operates with the mind, and

contributes to the formation of the ideas; the one which takes place from the brain to the nerves conveys the mandates of the will *from* the mind to the muscles of voluntary motion, and produces an act of volition. These nervous actions are excited, some by external matter; some by the immaterial principle; and some by either; and they all form concatenations with each other, which enable them to follow one another spontaneously, if not disturbed by a new impulse from the will, or from external matter. In viewing them separately, I shall first notice the physical sensations, which must, I should suppose, from the nature of the understanding, precede every other mental operation, at least during the first development of the mind.

THE PHYSICAL SENSATIONS.

The material principle has, as I have before observed, the power of operating upon our immaterial part. The capability of the latter to *feel*, or to be sensible of the action of the former, is called the sentient power. The

effect produced by matter on the immaterial principle is called a sensation.

SENSATION.

It seems that an action of an unknown nature is excited in the nerves of the organs of sense, by the various undulations of the air, by the rays of light in all their different colours, and reflected by material objects at different angles, by the subtle particles emanating from odorous substances, and by the more intimate properties of bodies that have the power of affecting the organs of taste and feeling; and that this action of the nerves is communicated to the brain, and from thence to the mind, in which it produces a *sensation* —which may be painful, pleasing, or indifferent. This constitutes the first and lowest order of functions belonging to the nervous system of the animal life.* When an act of

* This simple power of feeling, this sentient faculty, distinct from the power of perceiving *what* makes us *feel*, together with volition, are, I suppose, the two single faculties that belong to the lowest class of animals where vegetable life ends and animal life begins.

the perceptive faculties is combined with a sensation, it constitutes, as I should suppose, a perception, which, being the first operation of the understanding, will be presently considered. The next mental operation consists in the formation of ideas.

THE IDEAS.

The second order of nervous actions seems to take place in the brain *alone*, and it constitutes the material action concerned in the formation of ideas.

FORMATION OF IDEAS.

An idea appears to me to be formed by the combination of an intellectual and cerebral action. The ideas are excited by the physi-

However trifling the powers may be, I believe that they always exist together, proportioned one to the other, and that wherever there is sensation, there is also a power of self-defence.

cal sensations, by the will, and by *other* ideas. They succeed each other in the mind incessantly (at least during our waking hours), and spontaneously; but their course can be altered by new sensations, directed by the will, and is at all times more or less regulated by the tendency of ideas to form *associations*.

ASSOCIATION.

Two or more ideas may become concatenated, so that when one is excited, the other shall naturally follow; and these concatenated ideas may be associated with moral or physical sensations, or muscular actions; so that the sensations will be always followed by the particular ideas, and the ideas will, in like manner, be followed by moral sensations, or by actions of the muscles.

I would refer the phenomena of association entirely to *the nervous action* concerned in the ideas, sensations, and acts of volition; for I am inclined to think that the *mechanical* part of all the mental operations is carried

on by the *material*, not the *spiritual* agency—the first being known to act mechanically; while such a mode of operation seems repugnant to the nature of the latter, as far as we can form any notion of it. The analogy which exists between the regular succession of muscular actions, when they occur mechanically in the order in which they have been excited, and the regular succession of ideas, gives me reason to suppose that both are regulated by the same laws which connect nervous actions. We find that "if a train or succession of nervous actions takes place, they become concatenated, and are liable to recur in succession, if one of these actions is accidentally or voluntarily induced." Now, as the cerebral action is concerned both in the mental and the muscular phenomena, it may not be irrational to suppose that a concatenation of nervous actions takes place in one case as well as in the other. Upon this subject I will hazard a conjecture, which I have formed, under the supposition that the nervous action consists in the operation of a nervous fluid: it is, that when this fluid has been

impelled by the will, or by any other exciting cause, in a particular direction, it retraces the same course with more readiness and facility.

HABIT.

To this we might attribute the power of *habit* in the muscles of the animal life, and perhaps the regularity of action in the muscles of the organic life. In both cases we find that a *disordered* nervous action becomes a regular habit in the course of time.

The concatenation of our ideas is formed independently of the will; but this faculty may be exerted, in order to produce voluntary associations; it can form them by directing the attention to two or more objects alternately and repeatedly; but I doubt whether it can ever break the link when once it has formed. The gradual operation of time alone can effect this, by causing forgetfulness; the nervous actions grow weaker in time, if not occasionally re-excited, and the union is then frequently dissolved;—or it may be suddenly

broken by the interposition of more powerful nervous actions, particularly those produced by a morbid state of the brain; and we find that in insanity, many old associations are destroyed, and new ones are formed. Inflammation of the brain, fever, fits, and comatose diseases, also destroy former associations of ideas, by disordering the nervous action. If they *weaken* the cerebral action, the power by which they unite with so much tenacity is diminished or lost; the ideas themselves lose the force and vividness with which they were presented, and the *memory* is then said to be injured. To this faculty I will now direct my attention.

THE MEMORY—DEFINITION.

It is to the power which the brain possesses of repeating and concatenating its actions, that we owe the faculty of the memory, which in my opinion, is not a faculty of the immaterial principle, but results entirely from this capability in the material organ. If we consider the nature of this operation, we shall

find that it consists in the repetition of former cerebral actions, in the same order in which they have been excited—a repetition which *can* take place spontaneously, and without the assistance of the will, or of any other mental power, except the perceptive faculty. What appears to be an exertion of the faculty of memory is an act of the *will*, which excites and directs the cerebral action, and calls forth particular trains of ideas. The will, directed by the judgment, and combined with the cerebral action, is therefore sufficient for the purpose, without supposing the existence of any distinct mental faculty. Indeed, the memory seems to me to be more mechanical than voluntary; for we are often unable to remember what we wish, while we are compelled to remember what we do *not* wish. When we would recal an idea, or train of ideas, we are obliged to employ indirect means, such as seeking some sensible object, or calling forth some other idea, with which the the one required is associated. But the will may be exerted very successfully in securing future recollections, by giving

force and vividness to an impression which we wish to recall at a future period. This can be done by directing the attention to it exclusively; by reiterating it; and by associating it with ideas which are more likely to present themselves spontaneously.

NERVOUS ACTION CONCERNED IN THE IMAGINATION.

Before I quit this part of the subject I must notice the capability of the brain to form *new* combinations, and repeat former impressions in a different order from that in which they have been received, which appears to me to be the material means by which the imagination operates.

The new arrangement of the ideas may be produced by the will, and by the moral and physical sensations, as all these have the power of exciting the cerebral action concerned in the formation of the ideas. The operations of the imagination are more or less regular, according to the causes which excite and direct them. In invention, they

are directed by the will and the judgment, and the memory has a considerable share in the operation. Their greatest wildness and irregularity is exhibited in the phenomena of dreaming, and in delirium, when new associations are formed entirely independent of the judgment and the will: in this case, they seem to be excited exclusively by the moral sensations, and to be considerably influenced by the state of the nervous system. If the connexion between the moral sensations and the nervous action were traced, some light might possibly be thrown on the subject. This connection will be the next subject of consideration, and I shall now offer an hypothesis which I have formed respecting the share taken by the nervous action in the feelings of the mind.

THE MORAL SENSATIONS.

The third nervous action takes place, in my opinion, from certain internal nerves *to* the brain, and forms the material action concerned in the production of the moral sensa-

tions or feelings of the mind. My reasons for this opinion will be presently detailed.

The sensations which I call *moral*, to distinguish them from the physical sensations, include all the feelings, emotions, and passions of which the human mind is susceptible.

DEFINITION OF MORAL SENSATIONS.

I should define a feeling of the mind to be a *sensation* of a peculiar kind, associated with an idea, or a train of ideas. Upon considering their nature, I cannot doubt that they are sensations, i. e. nervous actions, felt by means of the sentient power, but of a different kind from those produced through the medium of the external organs of sense, and excited by a different cause, that is, by the ideas, instead of by external matter. The moral sensations are in some cases naturally associated with the ideas which excite them, and in others the association is formed by circumstances: these sensations excite in their turn other ideas, belonging both to the memory and the

imagination. The imagination appears to me to be most powerfully excited through this medium.

SEAT OF THE MORAL SENSATIONS.

The distinctness with which I can trace the action of the moral sensations to the region of the chest, convinces me that it is not confined to the brain, but that it is intimately connected with certain internal organs. In this opinion I have been confirmed by every observation which I have made upon the phenomena which the mental feelings exhibit. I will now explain my notions respecting the *part* of the nervous system to which I think this action may be referred. We cannot of course refer it to the nerves of the external senses; still less to those of voluntary motion; neither is it probable that the nerves derived from the ganglia and the spine, by which the vital functions are carried on, should convey the moral sensations to the brain. I would therefore place them in the *cerebral nerves* which descend to the vital organs, and which

thus appear to connect the animal and the organic life. Might they not result from the excitation of the *eighth pair of nerves*, or *par vagum*, which, in its long and irregular course, traverses the lungs, and gives off branches to the heart? The action of some nerves in the chest is so evident, in this class of operations, that the feelings have been referred to the heart by common opinion from time immemorial. The branches of cerebral nerves which the heart receives do not appear to be intended for the purpose of producing muscular motion, as the contractions of this organ are carried on independently of the brain: we may therefore suppose that they are intended to answer some other purpose. The par vagum sends branches to the larynx, and it also adheres firmly to the lingual nerves for some way after leaving the brain, which may possibly account for the rapid and direct influence of the mental feelings upon the voice. This great nerve continues its course through the stomach and liver; but so far from presenting an objection to the hypothesis, it accounts, in my opinion, for the effect

which complaints of these organs have upon the mind, and also for the manner in which they are affected *by* the mind.

FEBRILE ANXIETY.

There is a peculiar sensation attending that derangement of the animal frame, which produces fever, that seems to favour my hypothesis, and which is thus described :—" The sense of weight, fulness, and great uneasiness at the breast, which is denominated *febrile anxiety*, is totally different from, and independent of, the general uneasiness all over the body, and often occurs in very a disproportionate degree : it resembles that anxiety which takes place from grief, fear, and other depressing passions of the mind, and which is also accompanied by paleness, and diminution of size of the veins, which are seen on the surface. The patient likewise respires irregularly, as one under the influence of the passions just noticed, and frequently sighs deeply, as if to free himself from the load that oppresses the region of

the heart." Hence it appears that certain disturbances in the physical and mental parts of our nature produce the same *sensation*, in the same region, which is the breast, and the sense of anxiety, so remarkable in fever, may probably be attributed to this cause, viz. that the action of the nerves to which I refer the mental feelings, is deranged, owing to the feverish state of the whole system. As these particular nerves partake of the general derangement, the peculiar sensation, *without* the associated idea, is excited; the *physical* part of the operation only takes place, and we experience the pain without the corresponding mental cause. But even when this painful nervous action has been roused by an idea, and constitutes a feeling of the mind, we must have frequently observed that it remains as a mere *sensation*, when the thoughts are turned to objects that have no connexion with our grief.

SEAT OF THE MORAL SENSATIONS.

It must not be supposed that I consider the

heart, or any other organ, as the seat of the moral sensations. I believe that sensation is produced in the *mind* by the action of the brain, and that, consequently, the mind is the seat of sensation, and the action of the brain its immediate cause. Neither do I attribute the excitement of the brain in the production of the mental sensations to the action of the heart, lungs, stomach, or liver, but to the excitation of certain nerves, connected with all these organs. I have drawn this conclusion: first, from their situation; secondly, from the observations I have made upon my own internal sensations; thirdly, from the peculiar effect produced by affections of the mind upon these organs, and by affections of these organs upon the mind.

SITUATION OF THE EIGHTH PAIR OF NERVES.

First, with respect to their situation — as one part of the nervous system is allotted to the mental, and another to the vital functions, it seems not improbable that the eighth pair of nerves, which originates in the brain like the

former, and passes into the internal organs like the latter, should connect the mental and bodily as well as the animal and organic functions; secondly, the observation of my own sensations naturally leads me to refer the mental feeling to the region of the heart and lungs; we cannot, it is true, trace the nervous action farther; but perhaps it becomes less evident to ourselves as it recedes from the brain, in the same manner that the sense of taste, which is distinct at the œsephagus, grows fainter in proportion to its distance from the brain, until the action of its nerves becomes imperceptible to the mind; thirdly, the effect of the mental feelings upon the internal organs, and of these upon the mind, is a subject which requires longer discussion. It is very evident that the influence of the mental affections upon the bodily health is very considerable, and it is also a fact, that the organs traversed or connected with the eighth pair of nerves are those which suffer from this influence. Diseases of the heart, consumption of the lungs, dyspepsia, and bilious complaints, are caused by too strong, or

long-continued excitement of the mental feelings. The heart is less liable to disease than the lungs, stomach, or liver, in this case, and the stomach is the most susceptible of all, and is in general the first organ affected. Now it is to be remarked, that the heart only receives a *branch* of the par vagum; while the trunk of the nerve traverses the stomach, forms its means of communication with the brain, and has a share in the operation of digestion. This may account for the effect of strong emotions, which is sometimes so powerful as to arrest the digestion suddenly, and also for the general diminution of the digestive powers, in consequence of affliction or anxiety—a diminution which I would attribute to the exhaustion following the over-excitement of the nerves passing from the brain to the stomach. The liver lies more remote, and is affected in a more indirect manner: the depressing passions produce *chronic affections* of the liver, and, we may observe, that they are *preceded* by a disordered state of the stomach.

RECIPROCAL INFLUENCE OF THE MIND AND THE DIGESTIVE ORGANS.

If the digestive functions are affected by the state of the mind, they exercise in return an influence as powerful over our immaterial part, and whether their derangement proceeds from mental or physical causes, it equally impedes the due performance of the mental operations : perhaps because the above mentioned nerves, which communicate directly with the brain, affect the cerebral action concerned in the formation of the ideas. Common experience shews that a disturbed state of the stomach confuses the ideas and thus incapacitates the mind from using its powers; it also influences the feelings and disturbs the imagination, producing anxiety, timidity, melancholy, and irascibility.—Now this can be easily accounted for, by supposing that the nerves concerned in the production of the mental feelings, and in the excitation of the ideas associated with them, were in a morbid state of irritation.

REMARKABLE CHRONIC DISEASE.

Before I close this subject, I will notice a chronic disease which strongly displays the influence of the internal organs upon the feelings.

This disease, which attacks the viscera successively, has no distinct place in the nosology, and is treated as a derangement of whatever particular organ is principally affected. But from the observations which I have had the opportunity of making upon its origin and progress for years, I have been led to conclude, that it *is* a distinct disease, which has its seat not in the organs themselves, nor yet in the general nervous system; but in that particular division of it which immediately connects the mental and corporeal functions. —In short, that it consists of a disordered action of the eighth pair of nerves, which consequently affects all the organs connected with it. The characteristics of this malady are, first, its course and progress, which distinguish it from a mere stomach or liver complaint, and

give it the appearance of a *succession* of complaints. It first shews itself in the lungs, affects the heart in various ways, afterwards descends to the stomach, and from thence to the liver and the upper part of the intestines, following the same course, it will be observed, as the eighth pair of nerves. Secondly, it is made remarkable by its potent effect upon the feelings, producing irascibility, agitation, occasional melancholy, anxiety, arousing passions which do not always belong to the character, while the excitation which they give to the cerebral action, fills the imagination with horrible and painful ideas, causes frightful dreams and nightmare and produces an apprehension of insanity.

Slighter cases are only marked by depression of spirits and irritability of temper: the malady exhibits its most decided character in individuals of an ardent temperament and *deep* as well as strong feelings, and appears to have its origin in the disturbance of these feelings, and in a too violent excitation of the cerebral action. The third distinguishing characteristic of the complaint is, that

it does not yield to medical treatment like any other affection of the digestive organs, but clings to the constitution till it has spent its fury.—The reason of this is obvious, if it is caused by a disordered nervous action, for in the first place the cause is not *removeable*: when stomach and liver complaints are produced by a bad climate, intemperance, etc., much may be done by the exertions of medical skill, but here it seems capable only of relieving symptoms. In the second place, the treatment of nervous diseases is not so well understood as common obstruction or inflammation, and even if it were, this malady would have little chance of amendment if it is nervous, because it is never treated as such. It may indeed appear strange to ascribe a vitiated state of the secretions to a nervous cause, but since the action of the nerves is necessary to the operation of secretion, bilious and nervous causes cannot be so totally distinct as they appear at first sight. I might mention a fourth symptom, which indeed seems to be an attendant of *every* nervous disease, but never in a manner so distressing. — This is an

extreme susceptibility to atmospheric changes, especially with respect to its dryness or humidity, and also to the course of the wind. The influence of weather in this case is so powerful as to produce attacks of the complaint without any other apparent cause. The nerves do not appear to be so much affected by the actual humidity of the atmosphere, as by the electrical state which precedes the *change*, and we find that a nervous barometer of this kind can frequently foretell an alteration in the weather, before the clouds make their appearance. It is my opinion that the hypochondriasis is also a disease of the eighth pair of nerves, originating like the former in over-excitement, mental or bodily. But it differs from it in this respect—hypochondriasis exhibits loss of energy, *habitual* melancholy and sluggishness of the vital functions, the other disease shews an *increase* of excitability along the whole course of the eighth pair of nerves, an extreme irritability in the organs of digestion, a morbid state of the secretions rather than a deficiency, and an inflammatory tendency in the liver or lungs. In my apprehension the

same cause that produces hypochondriasis in in persons of a phlegmatic temperament, when they have lost the vigour of youth, induces the complaint above described in individuals of an ardent mind, an inflammatory habit, and in the prime of life. The notion that hypochondriasis is merely a disease of the imagination must now be quite obsolete; for whoever has been troubled with nervous affections (and to whom are they now unknown?) must acknowledge that the sufferings arising from a disordered state of the nerves that belong to the digestive organs are but too real, and not the less so because the mind is affected also. In this case the body and the mind react upon each other: the despondency, fear of death, suspiciousness of disposition, and pertinacity in magnifying unpleasant sensations, affect the functions of life; while the derangement of the latter, in return, depresses the spirits and enfeebles the mind.

The last observation that I shall make on the malady above mentioned is, that I have sometimes seen it alter its direction, after having run some part of its course, but it

always preserves its characteristic effect upon the spirits, though in a less distressing manner, and it remains involved in the same obscurity, baffling every endeavour to eradicate it from the constitution. In one case, after having traced its progress through the lungs, stomach and liver, I have seen it expend its irritating influence externally on the muscles and skin, in inflammatory affections, for which the sympathy between the stomach and the skin may possibly account. Upon the whole, when I consider the singular phenomena exhibited by this disease, the mysteriousness of its origin, the tenacity of its adherence, the peculiarity of its course, the degree of its dependence upon atmospheric changes, and the tyranny of its influence over the mind, I am strongly inclined to believe that it is of a nervous character.

OFFICE OF THE MORAL SENSATIONS.

The moral sensations constitute the *motives* of our actions, that is, they move or incline the mind to the performance of parti-

cular actions, but of this more will be said in the section on the will.

VOLITION.

The fourth nervous action takes place from the brain to the nerves, and it is excited by volition, which I define to be the power which the immaterial principle *exercises* over matter, and over mind through the medium of matter, i. e. the brain.

I distinguish it from the *will*, which I consider as a *state* of the mind, to which it is led by the ideas and moral sensations, while volition is an active faculty which calls into action the material organs allotted to the purposes of the mind. Volition excites the brain to the production of ideas, and through this organ the nerves to the production of muscular motion, (including the important movements of the tongue) by which means we are enabled to cause changes in surrounding matter as far as our power extends. Volition is the active power of the will : but as the capability of the will to *use* this power depends upon the capability of the material organs to

obey it, and other circumstances, the state of mind we call *willing* is not always followed by the corresponding act of volition.

MODE OF THE OPERATION OF VOLITION IN THE PRODUCTION OF MOTION.

Upon attentively examining the mode of the latter operation, it appears to me that the nerves of the voluntary muscles are not excited *directly* by the immaterial principle, but through the medium of the brain, and in the following manner. The imagination represents in idea the action we are about to perform, and if the power of volition is exerted, the cerebral action concerned in these ideas is followed by a corresponding *nervous* action, which takes place in the voluntary muscles.

CONCATENATION OF NERVOUS AND MUSCULAR ACTION.

By repeating certain nervous and muscular actions in succession, they become associated and follow each other mechanically, when they have received the first impulse from the power of volition.

OPERATION OF VOLITION IN THE EXCITATION OF IDEAS.

The power of volition also excites the cerebral action in the performance of the *mental operations*, and enables us to call forth particular ideas, or trains of ideas, at pleasure. The concatenation of the *nervous* with the *cerebral* action, is made evident by the convulsive motions of the limbs, when the brain is excited by other causes than the will, as in fits of various kinds.

INFLUENCE OF PHYSICAL SENSATIONS OVER VOLITION.

The movements of the muscles which in man constitute the *fourth* nervous action, because the ideas and moral sensations are interposed between the physical sensations and the acts of volition, must I suppose form the *second* nervous action in those of the brute creation that have no brains, and it is probable that in this lowest class of animated beings, *motion* follows as a direct consequence

of *physical sensation*. In brutes of a higher class, motion necessarily follows the *moral sensations*, i. e. *feelings*, but in man, the nervous action can be suspended to allow the exercise of the judgment and other intellectual powers. Sensation has undoubtedly a certain share of influence over our actions, but this is neither irresistible nor even *direct*, for the operations of the understanding are, or ought to be, exercised between the impressions made upon us by matter and those which we in return make upon material objects. It was not intended that we should move like machines, under the influence of sensation, but that the faculties which are granted, to enable us to direct our motions to rational purposes, should first be exerted. We even have the power of acting *against* the influence of sensation, and nothing proves to me more clearly the existence of a principle differing from and superior to matter, than the capability which I feel internally, of exciting and directing one material operation in direct opposition to the influence of another.

FOUR NERVOUS ACTIONS—RECAPITULATION.

From the above it will appear, that I believe the nervous actions to be of four kinds. The first is an action of the *nerves of the senses*; it receives its excitation from external matter, and conveys it to the brain, which it excites to the production of *physical sensations*. The second is an action of the *brain*, it receives its excitation either from the nervous action concerned in the physical or moral sensations, or from another cerebral action with which it is associated, or from the will; and it co-operates with the immaterial principle in the formation of *ideas*. The third consists (in my opinion) in the action of certain *internal nerves*, which seem to connect the mental and corporeal parts of our nature : it receives its excitation from the cerebral action concerned in the formation of the ideas, and it excites other ideas in return; this constitutes the *moral sensations*. The fourth consists of the action of the nerves of *voluntary motion*; it is excited by the will; in this case, the action commences in the brain and ends in the

muscles of voluntary motion and constitutes an act of volition. These four nervous actions form concatenations, in the order in which they have been enumerated. The first proceeds from the exterior of the body to the brain.—The second is confined to the brain alone.—The third takes place from the brain to the internal nerves.—The fourth proceeds from the brain to the exterior.

INTELLECTUAL OPERATIONS.

The office of the material organs which are allotted to the purposes of our spiritual part, formed the subject of enquiry in the last section : the powers of the principle which *employs* these agents, will be the next object of consideration.

ATTRIBUTES AND NATURAL POWERS OF THE IMMATERIAL PRINCIPLE.

The most deep and fixed attention that can be bestowed upon the phenomena of the mind, will not enable us to discover its essence, or

constituent substance: we can only perceive that it possesses and exercises certain faculties which distinguish it from every other principle with which we are acquainted.—We can be clearly conscious that we *feel* the impressions made upon us by matter, that we can *perceive* or be sensible, of the existence, properties, and relations of the things which makes these impressions upon us; and that we can, to a certain degree, *voluntarily direct* our material and mental operations.—These, which we call the sentient power, the understanding and the will, appear to me to be the inherent powers of the soul, and its distinguishing attributes; not acquired, but forming as it were, a part of its nature, and distinguishing it distinctly from matter, which, in every situation within our knowledge, shews that it does *not* possess them. (*See Appendix, Note* 5.)

ACQUIRED POWERS OF THE IMMATERIAL PRINCIPLE.

We feel, perceive, and act, as soon as our powers are called forth, but the capability of

perceiving with *correctness*, and directing our *movements*, with *certainty* and *precision*, is acquired. For this purpose we are enabled to perform certain mental operations: the cerebral action on the one hand, can be excited to the repetition of former impressions, and to the formation of new combinations, in the operations of memory and imagination; the immaterial principle on the other hand, can excite and direct the operations of the brain, combine and arrange these various materials, form others from them, and by means of its acquired knowledge and numerous ideas, become an enlightened rational agent: in this manner the memory and imagination supply the materials, and the judgment makes use of them.

The faculties which are the most immediately connected with the material action, viz. the sensations, ideas and volition, have necessarily been included in the preceeding section; those which remain are the intellectual powers, and the will, which will be treated under two separate heads.

POWERS OF THE INTELLECT.

The powers of the intellect are the highest attributes of the immaterial principle.—They consist, I apprehend, of the perceptive faculty, the judgment, and the imagination; the reasoning power I do not consider as a separate faculty, as reasoning is only an extended operation of the judgment—it is a chain of judgments.

THE PERCEPTIVE FACULTY.

The perceptive faculty is the power by which we are made sensible that things possessing certain properties exist. It is the first intellectual power that is developed, and the one which derives most assistance from matter in its means of operation. Its objects are either material, in which case they are presented by the senses; or mental, when they are presented bythe memory and imagination.

PERCEPTION—SIMPLE, COMPLEX, AND ABSTRACT IDEAS.

The first *active* operation of the mind, is

perception, which appears to me to take place in the following manner. The various properties of an object make their several impressions on the mind, through the medium of the organs of sense and the brain: this is *sensation*, and so far the mind only *feels* the impression made by the colour, taste, etc., of an object, and is passive under the operation: but these various impressions are repeated by the brain, and become concatenated, and then present to the mind the idea or image of the object with all its properties combined, as far as they have been made known to us by means of the sensations; if one property alone is presented, as for example, light or darkness, it forms a *simple* idea: if several, as man or ship, it is a *complex* idea. By observing that different things possess the same properties, we form the idea of a property *or* a quality, *independently* of any one particular object, and this is an *abstract* idea.

LANGUAGE.

For this purpose we require the aid of

language, which represents by signs, what cannot be represented by images, and thus enables us to perform the higher intellectual operations. I should suppose that the sensations, and the repetition of them by the cerebral action, form the foundation upon which the superstructure of all our other ideas is gradually raised by the operation of the mental faculties. If we were only susceptible of sensation, we should feel an impression without attaching any idea to it, no corresponding action of the brain being excited; this is probably the case with animals that have no brains, and consequently can only *feel*, and do not *perceive*.

ABSTRACTION.

The difference between sensation and perception is made evident when the mind is in a state of *abstraction*, that is, when it is occupied in perceiving the ideas presented by the memory and imagination. instead of those produced by surrounding objects. In this case, the mind still receives the impressions

of light, colour, etc., which external objects make upon it, because when we are awake, the channels of communication with external objects are not closed ; but it is passive under these impressions, and attaches no ideas to them, because it is at that time employed in the perception of other objects.

THE JUDGMENT.

The judgment is more intellectual in its operation than the perceptive faculty, and is the power next developped in the mind.

DEFINITION OF THE JUDGMENT.

The faculty of perception makes us aware that things exist : but they not only *exist,* but *act* upon each other, by means of certain powers and properties, and the *judgment* is the faculty by which we are made sensible, that the change which takes place in one object, has its cause in some property that resides in another. The means by which we are enabled to use this power with correctness, are expe–

rience and observation; these form the judgment, and gradually give us the capability of discerning causes and foreseeing effects with accuracy. We first perceive that certain objects always produce particular effects upon ourselves, and we attribute these effects, (i. e. sensations) to certain properties possessed by these objects. By observing that the same objects under similar circumstances, produce the same effects, we learn to foresee what effects will follow a particular *cause*, and to form conclusions respecting what cause must have produced a particular *effect*. . The judgment decides respecting what *must* be, by what *has* been, and this recollection of what we have felt and observed, we call experience. The same causes must produce the same effects, under the same circumstances, and it is this certainty which enables the judgment to draw right conclusions : a correct knowledge of the *attendant circumstances*, is therefore as indispensable as a *precedent*, to guide the judgment, and our ignorance or error on this point is one of the numerous causes that mislead this faculty. As the judgment is formed by ex-

perience, its accuracy must be partly dependent upon the particular circumstances in which we have been placed: hence, while physical perception is nearly the same in all men, this faculty exhibits different degrees of power even in minds possessing an equal degree of *natural* capability, because it not only varies according to the strength of the intellect to which its belongs, but also according to the means by which it has been developed.

THE REASONING FACULTY.

The capability of judging respecting *immediate* causes and effects is not sufficient for the execution of the mental operations. We are enabled, therefore, by the help of the memory, which presents facts and former judgments to the mind, to *trace a series* of causes and effects, and to form a chain, of which every link is a judgment. The power by which we find the connexion between *remote* causes and effects, is the reasoning faculty. We judge and reason at first from our own sensations; and, as the mind un-

folds, we acquire abstract ideas, we judge and reason by analogy and induction. The more assistance we can derive from the physical sensations, the more certain is the operation of the judgment, whose liability to err increases in proportion to its dependence on the intellectual operations.*

THE IMAGINATION.

The imagination is, in my apprehension, the most intellectual and the last developed of the faculties. I should define it to be the power which the immaterial principle possesses of forming *new* combinations of ideas. The material means by which it operates consists in the capability of the brain to repeat the actions that have been excited in it in a different order, and to form associations

* As far as the physical perceptions and the memory can guide, I should suppose that sagacious animals are capable of *judging;* but when abstract ideas, and the power of reasoning is required, I believe they cannot proceed, owing to the want both of mental power and language.

under the influence of a *mental faculty*, instead of a real object. As we are incapable of *creating* a new idea, and can only form new combinations of those which have been already produced by received impressions, the imaginative faculty can only operate with the assistance of the memory. The faculty of the memory must therefore be developed before the imagination; the ideas belonging to each department will always be intermingled, and they will belong to the one or the other, according to the reality of their object. When we *invent*, the will and the judgment direct the imagination: when we give the reins to this faculty, the ideas succeed each other without any exertion of the will, and fanciful images, as well as recollections, flow spontaneously from the mind.

Like the ideas of the memory, those of the imagination may be excited either by present objects, by other ideas associated with them, or by the moral sensations. In dreaming, they appear to be excited exclusively by the latter. The action of the senses and the will being suspended, dreams are very much in-

fluenced by the state of the stomach, which confirms my opinion, that the nerves belonging to the digestive organs are connected with nerves concerned in the production of the moral sensations.

ENUMERATION OF THE MENTAL FACULTIES.

To conclude, the mental faculties may, I think, be enumerated in the following order: —Sensation, volition, perception, memory, judgment, imagination. We shall find that the lowest in the scale are the most material in their operation (with the exception of perception), the first developed in infancy, and the most universally possessed by the animal creation, the lowest class of brutes possessing only the two first, and the number of faculties increasing according to the degree of perfection of the animal. We may also observe that the inferior faculties can operate without the superior, while the latter cannot act without the former.

THE WILL.

What we call the will appears to me to be a *state* of the mind: it is its *determination* to a particular course of action; while *volition* is the power of acting in *consequence* of such a determination. Every act of volition must therefore necessarily be preceded by this particular state of the mind.

The mind is brought into different states of belief and doubt, determination and inclination, by different kinds of ideas. As belief and doubt are produced by the ideas which constitute *reasons*, so determination and inclination are produced by the ideas which constitute *motives*.

The operations concerned in an act of the will are three:—the first is the representation of the ideas called motives—these throw the mind into a state of determination; the second consists of the ideas called *resolutions*, which *shew* this particular state of the mind (and, in fact, the ideas are the only means by which its different states can be made

known); thirdly, the operations of the brain and nerves, which produce *mental action,* or *muscular motion* :—these are the *consequences* of this state of the mind.

MOTIVES.

First, the ideas which give a determination of the mind towards one course of action rather than another, are not merely *ideas,* like the reasons which are brought before the understanding to produce the state of belief; they are ideas *associated with the moral sensations*, and, in order to constitute a motive, the idea *must* be combined with a *feeling*, whether of liking or aversion, even if it be so slight as to be imperceptible to ourselves.*

* The ideas which produce conviction are not always perfectly free from these accompanying feelings, and will sometimes mingle with *reasons*, when we are drawing a conclusion, but their intrusion should be repressed; for as far as they have any influence, so far is the judgment liable to be biassed. Hence it is that a cool judgment will often decide more correctly than a stronger judgment that is under the influence of personal feelings, and that we sometimes judge better for

RESOLUTIONS.

Secondly, the class of ideas, which denote the state of the mind produced by the motives, are called *resolutions*. These may be followed immediately or not, by the mental operation or muscular action to which they relate.

In examining this class of ideas attentively, I find that it consists in the execution of the intended act in *imagination*. The act of volition which succeeds may, by repetion, become associated with these ideas, and follow them mechanically. In this case, the nervous actions concerned in the ideas and muscular motions become concatenated, and follow each other without a new act of volition. This must, I think, take place in somnambu-

others than for ourselves, because we can reason more dispassionately. When the powers of two individuals are *equal*, the cool temper will naturally have the advantage; and minds even of unequal power are brought more nearly to a level when passion shackles the one, while the faculties of the other are exercised without impediment.

lism; for the will has certainly no influence whatever during sleep.*

Nevertheless, we have the power of arresting or changing these nervous actions at every point, and calling forth other motives. If, like many animals, we had but *one* motive, viz. sensation, the action must irresistibly follow; but in the plurality of motives, and in the power of opposing immaterial to material impulses, the superior nature of man shews itself, and chiefly in the power of the the imagination, which is sufficient to overbalance the present and immediate influence of sensation, by the representation of future advantage. It is by this means that the mere expectation of eternal happiness, or eternal misery, can overpower the wish of present gratification, and the fear of immediate suffering; that it can enable us to lose the percep-

* If the nervous actions concerned in the motives, resolutions, and actions become concatenated, they naturally excite each other: this may be one reason that an appeal to the feelings has a more direct and immediate influence upon the actions of men than an address to their understandings.

tion of the present in the contemplation of the future; can check the full tide of passion, overcome the strongest resolutions, and arrest the execution of an evil action on the very point of its perpetration.

OBSERVATIONS.

I shall conclude this chapter by a few detached observations, which could not find admittance in a simple definition of the mental faculties, and I shall place them in the order that I have adopted in the enumeration of those faculties.

OBSERVATIONS RESPECTING THE FORMATION OF THE IDEAS.

The ideas, according to my supposition, are *formed* by the joint action of the brain and the mind; *excited* both by the will and the sensations; *associated* with the physical sensations, with each other, and with the moral sensations.

NECESSITY OF CEREBRAL ACTION.

The following are my chief reasons for believing that the brain has a share in the formation of the ideas :—

First, the formation of ideas is an operation that instantly ceases when the functions of the brain are suspended.

Second, the state of the brain influences considerably the regularity and perfection of its execution.

Third, the morbid state of certain internal organs that have a physical influence on the brain, have a corresponding influence upon the mental operation.

Fourth, the constitution of the body has an influence upon the constitution of the mind.

Fifth, the mind cannot, by the exertion of its power, *create* a single idea—they must all have their first origin in the impressions that are made upon it through the medium of the brain.

Sixth, the concatenation of ideas is perfectly analogous to the concatenation of nervous

actions: if one is accidentally excited, the others follow spontaneously in succession.

Seventh, the succession of ideas can take place without any exertion of the immaterial principle, as in the involuntary and mechanical acts of the memory in dreaming, etc.; and it can even oppose to a certain degree the voluntary efforts of the mind.

Eighth, when the functions of the brain are disordered, as in delirium and in insanity, the immaterial principle loses the power of directing them; the perceptions are incorrect; the association of ideas are broken and altered; and the judgment is actually deceived by the false ideas and associations which rise before it.

To be more particular:—it is very certain that when the cerebral functions are arrested, whether by chemical or mechanical causes, as by a blow on the head, or by the contact of unoxygenated blood in cases of suffocation, not a single idea can be formed; that inflammation of the brain causes false perceptions, and breaks the association of the ideas; that bodily fatigue renders them

vague and indistinct; that affections of the stomach and liver often produce an inordinate action of the mind, and disorder, confusion, and insubordination among the ideas; that constitutional torpidity and languor in the physical functions are usually attended by a corresponding slowness in the formation of the ideas, while the rapidity with which they pass before the mind and form their associations is greatly influenced by the warmth and irritability of the temperament; that our ideas result from impressions made *upon* us, and that they are not created by the immaterial principle; for the wildest notions of the most extravagant imagination are not formed of *new* ideas, but are new combinations of *former* ideas; that, although the immaterial principle has the chief direction of the operations that take place in the mind, the ideas sometimes succeed each other in opposition to its efforts—shewing that it is acted upon by a different principle, which is not in complete subjection:—lastly, that in insanity, the regularity of the mental functions may be restored by physical means, while *reasoning* is ineffectual

From these facts, which shew the great influence of physical causes upon the mental operations, it should seem that the organ whose functions connect the mental and corporeal parts of our nature is not only concerned in the regular performance of the mental actions, but that we are so constituted at present, that its assistance is necessary to enable the immaterial principle to operate *at all.*

My notions respecting the nature of the immaterial principle are not consistent with the belief that it is, like the material principle, subject to disease, or to any mechanical action. The supposition that it is liable to fatigue, to exhaustion, to derangement, etc., is, in my opinion, incorrect: it applies those terms to the *mind*, which properly belong to the mind's *agent.* It must be the *brain* which repeats mechanically the same actions that have been formerly excited by the will, or by external matter; it must be the brain which acts without the participation of the will when it is excited by external causes, and which produces false impressions on the mind when its action is

violent and irregular, as in insanity; and it is the brain which must be weakened in its action when it is exhausted by long-continued excitation. In this case the sensation of the fatigue and the indistinctness of the ideas is probably produced by the exhaustion of the nervous fluid. I believe that the occasional irregularities of the operations of the mind are entirely attributable to the nature of the causes that act *upon* it, and that the spiritual part, of itself, may be compared to a fixed and steady light, before which dark clouds may pass in succession, and for a while intercept its rays, while its nature and inherent powers remain unchangeable, except in their gradual increase of strength and brilliancy. This increase, however, must depend upon external causes, i. e. upon the circumstances which can add to the number of the ideas, and give them correctness; for without knowledge, its powers must remain undeveloped, and the luminary which might diffuse a dazzling radiance around, can only shew a light as feeble and powerless as the remotest star.

IDIOCY AND INSANITY.

I do not believe that the immaterial principle even of a lunatic or an idiot is in itself different from the spiritual part of a rational being; the same inherent powers exist in both, but the organ by means of which they *use* these powers is in an unnatural state. I am convinced that in both cases the fault lies entirely in the brain; the action of which is too feeble in the one, and too violent in the other.

CAUSE OF IDIOCY.

A laxity and defective organization of the brain may cause a total, or nearly total want of memory, by incapacitating it from repeating and concatenating the impressions it receives, and this might be sufficient to produce the phenomena of idiocy. The indispensable necessity of the faculty of memory is sufficiently apparent; for if our brain were not capable of repeating the impressions which the properties of material objects make upon

it, it could only feel the sensation they produced at the time, and our knowledge would end at that point. Idiots cannot, I suppose, be totally deficient in this respect; for they are capable of perception, and they generally retain, in a greater or less degree, the impressions made by external objects;* but there always appears to be a defect in the brain, which incapacitates them in a great measure from forming *associations* of ideas.

The immaterial principle of the idiot must possess the inherent powers of feeling, understanding, and willing; but when the agent of the mind is imperfect, the proper development of its faculties must be impossible. The over exertion of an active mind has been known to produce idiocy, which shews that it may proceed from want of power in the brain, without any natural imperfection of the immaterial principle. In this case, there is a *loss* of nervous energy, from previous over excitement; while in the idiot by birth

* The *cretins*, in the valleys of Switzerland, have not, I believe, even this degree of intellect.

there is a natural deficiency of nervous power from a bad organization.

CAUSES OF INSANITY.

I should ascribe the phenomena of insanity to a cause precisely opposite to that of idiocy. In this case, the energy of the brain is *increased*, which is made evident by the accession of strength not only in the physical, but in the mental powers—these being deranged, but not *weakened*.* The vividness of the ideas is such as to overpower, in many cases, even the impressions made by material objects; the power of the imagination is prodigiously increased; the memory is stronger and the associations more tenacious; but they are false, the old being broken, and new ones formed by the hurried and disordered action of the brain. If the derangement is protracted beyond a certain time, this new

* According to the account of a recovered lunatic, he could, during a paroxysm of insanity, perform with ease certain mental operations which were impossible to him at other times.

order of associations may become firmly established, and remain even after the brain is restored to a healthy state. The association of the ideas with the moral sensations is broken sooner than their concatenation with each other; for the first symptom of insanity is not an aberrationof *judgment*, but an alteration in the feelings, inclinations, and habits of life.* I imagine that the phenomena of insanity are caused by an increased secretion of the nervous fluid, as idiocy is produced by its deficiency; or the portion of nervous fluid required for the functions of an internal organ may be *transferred* to the brain, while the general quantity remains the same, or is even diminished, as in palsy, which I have often seen accompanied by a morbid action of the brain, particularly affecting the feelings. However it may be, the medical treatment required for the cure of mental derangement shews that it is of a physical nature, and the

* In canine madness, it is observable that the first symptom is a change in the *habits* of the animal; but he continues to *know* his master long after this.

brain, upon dissection, exhibits the same appearance as in apoplexy, epilepsy, fever, and convulsions. Perhaps the state of idiocy might admit of medical treatment also, and the faculties of the idiot might be further developed, if the physical causes of imbecility were made the object of attention. It is my belief that, in insanity, the *intellectual* powers do not undergo any change; but that as we can only perceive and judge according to the impressions we *receive*, our perceptions and judgments must of course be erroneous, if the impressions are false, the associations altered, and the real experience lost. So far is the spiritual part from being diseased, that it acts as usual in consequence of its impressions and associations, whether false or true: for instance, no lunatic who mistakes his friend for a mortal enemy will caress and confide in him in consequence—no, he will distrust him as he would have distrusted the real object when in his senses. The man who fancied his legs were made of glass carefully protected them from every accident, and the man who thought himself of enormous

bulk, refused to pass through a passage too narrow to admit a person of his imaginary bulk. But it would be endless to enumerate such cases. The lunatic retains the highest and most intellectual faculties, but in a state of inordinate action, overpowering those which are inferior, instead of operating by their assistance. The idiot, on the contrary, possesses only the lowest faculties, the others remaining undeveloped. In short, the phenomena they exhibit appear to me to be of an exactly opposite kind. They may be thus briefly enumerated:—the idiot possesses the powers of physical sensation and volition; of forming, but not associating ideas; a moderate degree of perception; little memory; and *no* imagination. The lunatic has a powerful imagination, vivid ideas, and a strong memory, except when its office is usurped by the imagination; an erroneous judgment, incorrect perceptions, false associations, and deceitful sensations. The moral sensations, which are wanting in the idiot, are intense or violent in the lunatic: the only point in which they agree is in the want of judgment, which

the one has lost, and the other never possessed. In extreme old age, the natural tendency is to idiocy; for the faculties decay, not because the spiritual part of the individual has lost its attributes, but because the brain and nerves have lost their sensibility. Frequently the experience which belongs to age, and the coolness and self-possession produced by the moderation of the feelings, make a compensation for the diminution of the mental powers, and preserve the correctness of the judgment.

IMAGINATION.

The imagination reigns despotically in the insane mind, and is, thus uncontrolled, a fearful and dangerous power; but this faculty is productive of extensive good as well as evil, and, when in proper subjection, is one of the noblest attributes of the mind. It is the power of the brain to form new associations of nervous actions, and of the will and the judgment to direct its operations, that the human mind owes its capability of

intellectual improvement, for if we only possessed the faculty of memory, and that the brain could only repeat impressions in the order in which it had received them, we could never overleap the iron boundary which would encircle our faculties.—The operations of the memory are certainly indispensable, and those of the imagination without them, could only serve to make madmen; but memory alone could never produce talent. It is the power of the will over the imagination, which makes us responsible for our actions, for it enables us to form new associations of feelings and ideas, though indirectly and gradually, and also to contend with a present inclination, by representing other motives of action; it is in fact, the field of battle in which the conflict of the reason and the feelings takes place. It also enables us to diminish our mental sufferings, and to increase our mental pleasures, by its influence over the nervous system of the moral sensations: when we hope, the imagination represents the event we wish for, accompanied by the pleasing sensations that would attend its reality.—Fear is the reverse

of this operation : brutes appear to be entirely destitute of imagination, which could only be productive of mischievous consequences, if not properly balanced by the other mental powers. The lunatic can never be considered as having sunk to a near level with the brute, though he is led by passion instead of reason, for insanity is characterized by wildness of imagination, and a *false*, not a *deficient* mental action. Neither can the immaterial principle of the idiot be compared to that of the brute. For it is inferior in appearance, and superior in reality : the unerring instinct, which supplies all deficiences in the brute and the well constituted brain, which gives to the higher orders a quick perception, and a strong memory, is productive of a decided superiority *practically* considered but the immaterial principle of the idiot is endowed with faculties which only lie *dormant* owing to the imperfection of its material agent, and which the most perfect cerebral action could never develop in the brute, because they do not belong to its nature.

OBSERVATIONS ON THE JUDGMENT.

Judgment—a sound and cool judgment, perfectly free from the influence of passion, is the most valuable, and perhaps the most rare of qualifications. Talent abounds, but calm good sense is as scarce as it is precious. The strongest mental powers cannot secure us from the dangerous and often unperceived effects of our own feelings upon our understandings, and so apt are we to deceive ourselves, that we often fancy that our judgment is guided by a *reason*, when in fact it is influenced by a *motive*, and we think that our actions are the result of *one* motive, when we are unconsciously impelled by another. When the feelings are strong, they not only urge us to act in opposition to the reason, but they affect the operations of the faculty itself. This accounts for the errors of judgment, and especially the deficiency of prudence, or practical judgment, often observable in individuals endowed with great mental powers, and consequently having the *natural*

capability of perceiving clearly the consequences of actions. Brilliant talents, which result from a quick perception and a lively imagination, are partly owing to a rapid and energetic nervous action, and the same cause gives quickness to the feelings; consequently, though the judgment may be very clear in indifferent matters, it will be biassed in those which nearly affect the individual, owing both to the warmth of the feelings, and the natural hastiness of decision which attends this character.* But the spiritual part is formed to rule over the material principle, and though it is subjected to its influence in a certain degree, it is also gifted with the capability of resistance. Its distinguishing characteristic is power combined with intelligence; and the exertion of the power according to the direction of this intelligence, is the most imperious duty that is imposed upon us. The natural violence of the feelings must never be consi-

* The strength of the nervous action has, in my opinion, so important an effect upon the moral and intellectual *character*, that I intend devoting a chapter to the consideration of the subject.

dered as an excuse for acting in opposition to the direction of the reason, for it is the trial that is allotted to us during our state of probation.

If the judgment is sufficiently strong to be of *practical* use, the feelings are distrusted and are never allowed to influence our actions until they have obtained the approbation of their calm and impartial director: they are vigilantly watched during every operation of the mind; and the motives which may influence the conclusions of the reason in argumentation, as well as the resolutions with respect to the actions, are duly scrutinized. Under the mild authority of this intellectual director, the passions are hushed, the prejudices and errors which naturally result from uncontrolled feelings are dispelled, the wishes and inclinations are restrained within bounds, and extremes of every kind are avoided. Indeed this alone would be productive of beneficial and important consequences, for all that is good and all that is useful lies between opposite extremes.*

* It may be objected the rule of steering between

The subjugation of the feelings is the most difficult but the most glorious task that can be assigned to an ardent mind: the exertion, however painful, is amply repaid by advantages, both temporal and eternal. In a worldly as well as in a moral point of view, the possession of a steady well-regulated mind is the most desirable and useful of all qualities: those who would govern others, must first learn to rule themselves. The most effectual power is that which is gained over the mind, for actions then follow of course; but it is only the preponderence of spiritual power that can ensure spiritual dominion,

opposite extremes cannot be an accurate guide to the conduct, because it is impossible to define the *line* exactly, as it must be different in the opinion of different individuals, and that for the same reason it is useless as an argument; for what seems within the bounds of moderation in the judgment of one person appears beyond it in the opinion of another. But I believe that such a rule is usefnl both in conduct and in argument; for it appears to me to be subject to calculation. I would place excess at the point in which the evil consequences predominate over the good: this point may be ascertained by examining consequences, and is not therefore so vague and indefinite as we imagine.

and it is never obtained by those who are themselves in thraldom, and are both deceived and tyrannized by their own passions. Besides, a calm and temperate state of mind can alone enable us to acquire that knowledge of the human heart, which is one of the best guides to the judgment, for it is as impossible to discern the motives of others, when we look through the medium of our disturbed feelings, as it would be to distinguish objects through the clouds of sand raised by the whirlwind of the desert. By judging of the intentions of men according to their character, their situation, and their feelings, without allowing ourselves to be biassed by our own, we learn to understand their motives and to foresee their decisions, and by regulating our actions accordingly, we are enabled to influence those of others and to avert many of the evils that may result from our relations with those that surround us. Unswayed by our own feelings, we harbour no prejudices, and while we make due allowance for the errors and weaknesses resulting from ignorance, mental infirmity, and all the circumstances that are adverse to the improve-

ment of the mind, we tear off the veil which vanity throws over our own imperfections, and judge ourselves with stern and inflexible severity. Strong sense, therefore, secures to us a more certain and lasting influence over our fellow creatures than any other kind of power—but the advantages which it brings to its possessor are even greater than the empire we gain over the souls of men—for the power that is appointed to repress every violent emotion—to crush every rebellious feeling—to guard with vigilance every weak point of the heart—and to govern the inclinations and affections with a view to the benefit of man and the honour of God—produces, if firmly exercised, a temper of mind so calm, so equable, so independent of external circumstances, as nearly to resemble the unclouded felicity it is destined to enjoy in Heaven, when moral and physical pain shall have ceased to trouble us for ever.

OBSERVATIONS ON THE WILL.

The conclusions I have drawn respecting

the general operation of the mental faculties is, that their effect is to throw the mind into two states: viz. of *belief* as to *facts*, and of *determination* as to *actions*. The first is produced by *reasons*, the second by *motives*.

THE STATE OF WILLING PRODUCED BY THE MOTIVES.

Further, it appears to me that the mind can only be thrown into these two states; though the capability of doubting, disbelieving, etc., seems at first to contradict this opinion; but I consider *disbelief* as the belief of a different proposition, and *doubt* as either a suspension of judgment, in which the mind undergoes no change at all, or an *alternation* of belief in two opposite propositions. The same may be said of the state of *hesitation* respecting our actions.* Belief, as I have before observed, is influenced by reasons—ac-

* I will here observe that the changes of nervous action in doubt and hesitation are extremely fatiguing to the brain, and that the prolongation of this kind of operation has the effect of producing nervous diseases.

tions, by motives. The reason that appears the strongest produces belief, and the strongest motive produces determination,

It should seem, therefore, that the mind is brought to a state of belief and determination involuntarily; and indeed, as far as I can discern, the mere power of volition cannot, by its *direct* influence, throw the mind into any state whatever. If, however, we remained at this point, we might adopt an opinion as false as it is dangerous, as it would put an end to free agency, and consequently to moral responsibility. But, upon consideration, we shall find that the *previous* operations of the mind, which give preponderance to certain reasons and certain motives, are in a great measure influenced by the will; and it is there that the responsability attaches. I believe that philosophers and religious moralists take up opposite opinions on the subject of free agency, and, as it seems, fly into opposite extremes. The necessity of belief in conse-

quence of the reasons presented to the understanding, being reckoned a dangerous doctrine by the latter, they will not grant what must be evident to every metaphysician—but on the other hand, if philosophers imagine that they are free from moral responsibility in the adoption of *any* opinion, this notion must be equally incorrect. It must be acknowledged that an act of belief is considerably less subject to the will than a muscular action ; but though the will may not be directly concerned in the production of belief, it has a large share in many of the operations which precede and which ultimately produce it—sometimes the responsibility may be traced very far, and must be sought in the habits and feelings which have been formed at a time antecedent to the adoption of some particular opinion ; these may indirectly influence our present decision. We know that we have the power of directing the course of our thoughts more particularly to certain considerations, both by direct and indirect means; of suspending our judgment, when it leads to immoral or irrational conclusions, by a proper

conviction of our own ignorance and circumscribed power; of distrusting our own conclusions from the consideration that our feelings, our circumstances, and the particular turn of our own character may influence us; of detecting and throwing off our prejudices and endeavouring to judge dispassionately; and of yielding with humility to a superior intelligent power.* This temper of mind will effectually secure us from adopting any notion destructive of sound morality, even if its truth should seem to be demonstrated. The most powerful and enlightened human intellect cannot be an unerring guide, which is made sufficiently evident by the opposite opinions maintained by individuals of equal mental power, and even by the same individual at different times. We must therefore

* At the same time we ought not to take offence at the pertinacity with which others maintain an opinion different from our own, as if it could only proceed from an assumption of superior judgment; for whoever examines metaphysically the causes of difference of opinion among mankind will readily perceive that it is impossible for all men to view the same object *precisely* in the same light.

beware of trusting to its clearest conclusions, if they are incompatible with moral truth, for the principles of the latter are certain and immutable, while our opinions are changeable and erroneous. Without this conviction, an enquiry into the nature of free will might, from what I have observed, be dangerous as well as perplexing: but the most subtle metaphysical reasoning must, in the rationally pious mind, yield that God has made us *responsible agents*; that God is *perfectly just*, and consequently that he must have made us *free agents*.

PRECISE POINT AT WHICH THE WILL AND THE JUDGMENT OPERATE IN THE PERFORMANCE OF AN ACTION.

Leaving aside the degree of freedom which the will possesses, we may easily ascertain the precise point at which its power is exerted, as well as that of the judgment. In the performance of an action, we find first, that some *physical sensation*, or some *idea*, excites another idea combined with a mental

feeling; this constitutes a *motive*, which acts upon the mind, and *inclines* it to a particular course of action, whether mental or muscular. It is at this point that the action of the will and the judgment are required. If we could only be influenced by a single motive, the will would be compelled to obey it, and this I imagine is the case with the lower order of brutes; but man is capable of being influenced by a variety of motives, and between the inclination and the action, the will can call them forward, and the judgment can form its decision: the ideas which constitute a decision of the judgment throw the mind into a state of *determination*, which is the state that must necessarily precede every voluntary action. Hence it is evident, that whoever acts from the impulse of a moral or physical sensation, without the aid of the judgment, acts like the brutes.

MOTIVES.

With respect to the nature of the various motives, we may observe that the human mind has but one object of attainment, and that all the motives of our actions may be reduced to the wish of avoiding moral and physical evil, and the desire of obtaining moral and physical good*. The same sentiment pervades the whole creation, the difference lying in the number and nature of the objects that are associated with these feelings of desire or aversion. The lower classes of animals have apparently no motive of action but the inclination for *physical* good and the aversion for *physical* evil. The higher classes are evidently gifted with some of the moral sensations, the gratification of which presents motives superior to physical sensation : for we may often observe that they have affections

* The preference which we give to the happiness of others, when we make a disinterested sacrifice, is no exception to the rule; for in this case, we derive more real satisfaction from the indulgence of noble and elevated feeling than from the gratification of a selfish wish.

which prompt their actions in defiance of physical pain. But still, the motive, whether moral or physical, is present—it is the attainment of *present* satisfaction, or the escape from *present* suffering. The rational part of the creation has another set of motives of a more intellectual kind, which is the representation of *future* pain or pleasure by the operation of the imagination, and this may be so forcible as to render the motives of this class more powerful in the direction of the actions than those of the other. As actions must take their direction from the strongest motive; the addition of this set is of the highest importance, for it is the means by which we are enabled to oppose the impulse of the passions. How precisely is this constitution of the mind adapted to the situation of a being, destined to a state of future reward or punishment, and made responsible for his actions! When passion and feeling strive against the conscience and the judgment, religion casts an eternity of happiness or misery into the scale, and the motives to virtue can then preponderate. The

more intellectual and free from passion is the mental constitution, the more easily will the anticipation of future pain and pleasure overbalance the influence of present feeling, and the inclination for present gratification. I shall conclude by observing that motives are the only means by which our minds can be controlled by others, for the immaterial principle is not subject to physical force. It is therefore free in proportion to its power of resisting the inducements held out by the moral and physical sensations.

OBSERVATIONS UPON THE DEPENDENCE OF THE IMMATERIAL PRINCIPLE UPON MATTER.

The immaterial principle not only acts upon matter, but receives impressions from it, and operates by means of this principle

ALL CREATED BEINGS MATERIAL.

It is my opinion that in this respect, all created beings are constituted alike, from the lowest, possessing only the faculties of sen-

sation and volition, to the highest endowed with the noblest intellectual powers. The privileges and perfections of a being untrammelled by matter, independent of sensations, and capable of acting without the aid of material organs, would I think be far beyond what appears on a first view, and I am inclined to believe that even *Angels* are not unembodied spirits ; that their frames though perhaps pure as light itself, are still material in their nature, and that the Supreme and Eternal Spirit alone exists independent of matter. Indeed any other supposition, in my apprehension, seems to diminish the distance between the Creator and his creatures, If I understand St. Paul rightly, our hopes for the future must be confined to the acquisition of a *better* body, not subject to disease or death, and possessed of more perfect organs : this alone would increase our mental powers prodigiously, even supposing that no alteration were to take place in the immaterial principle. The strongest intellect is greatly dependent upon the perfection of its material organs, and may be incapable of

using all its natural powers during its state of mortal existence, owing to a deficiency in this respect. The memory especially, which is an indispensable assistant in the performance of the mental operations, is dependent upon the constitution and actual state of the brain. The feelings and inclinations also, which in a great measure constitute the character of an individual, are partly dependent upon the physical constitution, and a perfect body may not only exempt us from disease and death, but enlarge our mental faculties by the superior activity and perfection of its organs, while it is the seat of purer feelings.

IDENDITY.

I should imagine that our *identity* must be sought in the active powers of the mind, i. e. in the power of *understanding* and of *willing*, which form the nature of the immaterial principle, while all that is dependent upon received impressions, and that is liable to alteration during our present existence, may be changed without affecting the identity of the individual. The active powers may re-

main *essentially* the same, though the means by by which they are exercised, the materials upon which they operate and the impressions to which they are subjected are different, and we shall, in fact, be the same beings when the material organs that are our tools, have ceased to obey our impulse, and when the passions, feelings, and inclinations which tempt and disturb us during this life, have given place to the pure and elevated sentiments which must be the natural accompaniments of a life of glorious immortality.*

DIGNITY OF THE IMMATERIAL PRINCIPLE.

Although I believe that the simple addition of more perfect organs would add considerably to our powers, I do not give it as my opinion that the immaterial principle will

* I have formed the following conjecture respecting the alteration that will take place in our physical constitution. Perhaps our immortal bodies may be so formed as to execute only the functions of the *animal life*, by which the immaterial part communicates with the external world, and the functions of the *organic life* will not be retained, being unnecessary to a body that is neither subject to decay nor death.

remain unchanged with respect to the number and perfection of its faculties. On this point, indeed, it is impossible to form any surmise. Of this however, I feel convinced, that the weakness and imperfection of the human mind is chiefly attributable to the constitution of its organs.—Their feebleness does not allow the soul to develop its real powers, while the nature of the moral and physical sensations subjects it to temptations of various kinds. Yet under all these disadvantages, how nobly does it soar above all that surrounds it; how infinitely is it superior in dignity to the most stupendous, the most beautiful and perfect combinations of inert matter! Weighed down by human infirmities, possessing but a partial power over a few atoms, and working with miserable tools, the intelligent power still shows its divine origin, and the mind which possesses sufficient energy to struggle with its difficulties, shines forth like a sun beam that pours its light from among dark and heavy clouds. If a limited degree of intelligence, occupying a single point in a feeble and imperfect frame, can retain the comprehen-

sion of sublime truths; can make splendid discoveries even beyond the confines of the world which it inhabits; can discover the secret workings of the elements; if it is possible for a limited will, ruling partially over so insignificant a portion of matter as a few nerves and muscles, to bring thousands of other beings into subjection, and to direct their actions; what notion then shall we form of the power and intelligence that occupies and fills infinite space, that wields the whole material world, and that governs all things in heaven and in earth! The imagination is dazzled, and the mind is overpowered by the very idea.

PART III.

EFFECT OF THE NERVOUS INFLUENCE

UPON THE

MORAL AND INTELLECTUAL CHARACTER.

PART III.

EFFECTS OF THE NERVOUS INFUENCE UPON THE MORAL AND INTELLECTUAL CHARACTER.

HAVING traced the effects of the nervous action upon the *vital* and the *intellectual* operations according to my apprehension of the subject, I shall conclude by giving the result of my observations upon its influence on the *character*. I shall, in the first place, consider the existence, office, and limits of this influence, after which I shall enter more fully into a detail of its effects.

EXISTENCE OF A MENTAL CONSTITUTION.

The human character seems, upon a first view, to present an endless variety of combinations, owing to the numerous causes which contribute to form, to alter and to modify it:

but an attentive examination of our own dispositions and those of others, will enable us to perceive that there is a *mental* as well as a physical constitution, reducible to a small number of combinations, and subject to classification. This constitution of the mind exhibits itself in the *natural* strength of the faculties, and in the *natural* force and tendency of the feelings which may be easily discerned by those who watch the development of the *infant* mind: it is born with us, and is connected, as I shall presently endeavour to shew, with the *physical* temperament: education, the operation of the intellect, and many external circumstances may change some of its distinguishing characteristics, but in general it is only softened and modified by them, and the original disposition often continues to exercise a silent and unperceived effect upon the individual, when it is apparently moulded anew.

CONNECTION OF THE MENTAL AND PHYSICAL CONSTITUTIONS.

It will not appear unlikely that a connec-

tion should exist between the mental and physical constitutions, if we consider that the mind receives its impressions through the medium of matter (i. e. of the nerves); that it performs its operations by the assistance of a material organ, and that this organ, which is the brain, is at the same time concerned in the execution of the corporeal functions: this must surely render the perfection of the faculties and the strength of the feelings dependent in some degree upon the activity of the nervous system. I certainly believe that the immaterial principle is created with its own inherent powers, and that it is only dependent upon its material organs for their *development* and *exercise*: but this dependence is so considerable, that the faculties may remain almost useless, owing to the imperfection of these organs, as in the case of idiocy. Two powers must therefore combine in the due performance of the mental operations; the one physical, the other intellectual. The difference in the respective strength of these two powers, is one source of the variety observable in the characters of men, as will

presently appear in the analysis of this part of our nature.

DIRECTION OF THE FEELINGS.

Hitherto I have only represented the nervous system as being concerned in the degree of quickness, clearness or vigour of the faculties, and in the force or tenacity of the feelings; its influence, so far, will perhaps be readily granted; but I would extend its limits still farther, for I believe that it has some share in the *direction* as well as the *strength* of the feelings. It must not be supposed that I ascribe their particular direction to a nervous cause: respecting the *cause* I offer no conjecture, and my object is neither to show *why* we are born with good and evil inclinations, nor from *whence* they originate, but only to state from observation, that certain passions and inclinations are more especially attendant upon one kind of nervous constitution than another. If, as I suppose, the feelings of the mind consist of a peculiar

sensation concatenated with an idea, it is easy to account for the connection of the nervous influence with the strength or feebleness, the tenacity or fickleness, the dulness or susceptibility of the feelings, because a sensation supposes a nervous action: but their *direction* must be very partially influenced by such a cause: that it is in some degree affected by the physical temperament however, is evident, especially in characters of a marked description, except when reason, education, or external circumstances have wrought a complete change in the original disposition: but this is seldom the case, and we generally find in civilized man, a mixture of natural and acquired feelings, which may possibly account for many of the inconsistencies which we detect in ourselves and others.

THE FOUR VARIETIES OF THE MENTAL CONSTITUTION.

I shall now enumerate and describe the

varieties of the natural character, which, as I have before observed, are fewer in number than might be supposed. The strength or feebleness of the nervous action produces two temperaments, which I shall distinguish by the appellation of the ardent and the phlegmatic: each of the temperaments may be united to a strong or a feeble *intellectual power*, and these four combinations, with the several gradations from one extreme to the other, form the varieties of the natural mental constitution.

ARDENT TEMPERAMENT.

An energetic nervous action (which I am inclined to attribute to an abundant secretion of the nervous fluid), produces a rapid circulation of the blood, a quick evolution of animal heat, with some tendency to inflammatory diseases, a certain degree of muscular power (independently of the strength or weakness of the muscular *fibre*) and a sensibility of the nerves, which gives vehemence to the feelings, warmth to the temper, and quickness and acuteness to the senses.

PHLEGMATIC TEMPERAMENT.

The slow nervous action is shewn by a tranquil circulation, a low temperature of the blood, a moderate portion of physical strength, an absence of irritability in the nerves, and consequently in the temper.*

But before I proceed, I must mention that physical strength is derived from two distinct causes, which, as it appears to me, form four different *physical* temperaments; as these also have their effect upon the character, I shall add them to the four mental constitutions above enumerated, and describe their various combinations. Physical strength results both from the firmness of the muscular fibre, and from the energy of the nervous ac-

* The richer the blood is in red globules, the stronger is the vital power, and the power of producing heat in the system. In the temperaments which physicians call *lymphatic*, in opposition to *sanguine*, and which I call phlegmatic, on account of its influence on the temper, the blood contains fewer of the globules which give it colour. It is more cold and watery, hence probably results the fairness of hair and skin, which is the usual external token of this temperament.

tion; "It appears (to use the words of an "able anatomist) that the power of muscular "contraction is in a compound ratio of the "*strength* of organization in the muscles, and "the *excitation* which they receive from the "brain. When both these are small, the "motives are feeble.—When both are ele- "vated to their highest pitch, we can hardly "set a limit to the effects which they may "produce. If energetic nervous influence "be combined with a weak muscular tissue, "or vice versa, the phenomena of contraction "hold a middle place, and this is the kind "of arrangement which we generally observe "in nature. Women and children who have "weak muscles, have a nervous system "easily excited: men, on the contrary, par- "ticularly athletic ones, have nerves less rea- "dily moved."

COMBINATION OF THE PHYSICAL CONSTITUTION.

The ardent temperament may be united, first, to a firm muscular fibre; and secondly, to a lax muscular fibre; and the phleg-

matic temperament may also be combined with a strong or weak muscular system. Of all the constitutions, the ardent temperament combined with the lax muscular fibre, is the most irritable : its physical strength is entirely derived from the vigour of the nervous action, and this is often irregularly distributed, and subjects the frame to various morbid affections, particularly of the nervous kind : the sensations are acute, and the mind partakes of the sensibility of the body, and is very liable to a morbid degree of irritability. The ardent temperament combined with a firm fibre, exhibits the greatest degree of physical strength : the constitution is vigourous, but liable to inflammatory diseases. The phlegmatic constitution united to a lax fibre exhibits the greatest deficiency of physical strength, but it does not seem particularly liable to disease until the strength is reduced below its natural standard by external circumstances : the nerves are not irritable, consequently the sensations are not acute, and the mind is usually placid. The phlegmatic temperament united to the firm fibre is

the most desirable of all constitutions, as it gives the advantage of strength, without irritability: an athletic form, robust health, and an even temper are its usual concomitants *.

EXAMPLES OF THE PHYSICAL CONSTITUTION.

These varieties of the physical constitution are best exemplified in the brute creation. — The difference of the two strong constitutions is seen in the tiger and the elephant; the first, compact, vigorous and alert, shews the energetic nervous action united to a firm muscle: the other, huge, ponderous and clumsy, shews the phlegmatic temperament combined also with the strong muscle. The soft muscle united to the phlegmatic temperament is seen in the fish kind; its combination with the ardent temperament I cannot trace in animals.

* I cannot help fancying that this was the constitution of Adam; but we have woefully degenerated since his time, for we seldom meet with that calm possession of power, that gives majesty to the deportment, and serenity to the mind.

EFFECTS OF THE NERVOUS INFLUENCE ON THE CHARACTER OF THE ANIMAL CREATION.

The part of our nature which is most especially the object of the present hypothesis, may be called the *animal* character of man, for it consists of all the natural passions, feelings, and inclinations, and of the faculties which operate chiefly by means of the nervous action. These, in a greater or less number, are also possessed by animals, to whom we cannot deny some of our feelings and faculties without opposing the evidence of our senses, nor refuse the possession of an immaterial principle, without incurring so far the charge of materialism. Their mental powers are certainly much fewer in number, and the highest faculties, such as the imagination, the reasoning faculty, and also the capability of forming abstract ideas, are, in my belief, totally wanting, as well as the moral sense. But we must allow them the faculties of perception, memory and even judgment, as far as it can be formed by personal experience;

and indeed many brutes are more particular than their superiors in profiting by their own experience.—(*See Appendix, Note* 6.)

The influence of the nervous action on the character, is more plainly discernible in the animal, than in the human subject, because in their case it is not counteracted by the operations of the intellect. This influence however is greatly moderated by domestication, for rational control changes the violence of the ardent temperament to a disposition at once generous and docile, and the sullen obstinacy of the phlegmatic temperament into a mild and patient tractability : a wise education has a similar influence on man, and when he is afterwards left to the control of his own reason, he finds his animal character as obedient as a generous courser to the direction of a steady and temperate master.

GENERAL CLASSIFICATION OF THE BRUTE CHARACTER.

In the animal creation, each temperament prevails through a whole species, excepting

in the higher orders, as the horse and the dog. Generally speaking, birds are of the ardent temperament, fishes of the phelgmatic, and quadrupeds of both. Among the latter, I believe we shall find that the ardent temperament includes the whole feline tribe, the ape kind, the deer, the hare, the fox. The horse is of two distinct temperaments as well as man, shewn in the Arabian and Flanders breed, and it is to be remarked, that this animal bears a striking resemblance to him, in point of nervous constitution. The phlegmatic temperament includes the ass, the sheep kind, the bovine tribe, the boar kind, the sloth, hippopotamus, rhinoceros, camel, etc., and I believe all amphibious animals. The elephant must be added, though endowed with a degree of acuteness that seems to entitle him to a place in the opposite constitution, but this results, I should suppose, from the possession of the highest degree of judgment that is compatible with the brute nature. In this I consider him as far superior to the ape, whose talent chiefly consists in the power of imitation.

GENERAL ADVANTAGES OE THE ARDENT TEMPERAMENT.

In the brute creation, the ardent temperament is distinguished by more beauty in the form, more generosity in the feelings and more acuteness in the senses and faculties, than belongs to the phlegmatic constitution; the brilliancy of the eye, the slenderness of the figure, and the grace and even elegance in the form and movements, with which their natural agility is frequently combined, places the finest animals in this class. With respect to man, many circumstances which I shall presently notice, serve to balance the advantages of the two temperaments.

EFFECTS OF THE NERVOUS INFLUENCE ON THE CHARACTER OF MAN.

It might be supposed that the natural character would be best exemplified in *uncivilized* man, for civilization diminishes the violence of the mental feelings, and often gives them an artificial direction; but I do not

look upon a savage as a being in a natural state, but rather as one sunk *below* it, whose mind is clouded by error, which I apprehend is the unvariable consequence of ignorance: the errors of the mind have the effect of perverting the natural feelings. — I therefore prefer examining the particular effects produced by the nervous influence upon the character of civilized man. It will only be necessary to describe the very marked characters which form the extremes in each class: the gradations may easily be supplied by the imagination.

CLASSIFICATION.

In enumerating the various combinations of the mental and physical qualifications with the two temperaments, I shall class them under the four following heads: 1st, the strong intellect combined with the ardent temperament; 2d, the same united to the phlegmatic temperament; 3d, the weak intellect combined with the ardent temperament; 4th, the same united to the phlegmatic.

I shall name the talents, virtues, and vices that seem to be the most usual attendants of each temperament, but it must be observed that I do not consider any quality of the heart as *necessarily* belonging to either: we may discover, by the general appearance of the feelings and faculties, to which temperament an individual belongs, but we cannot decide which qualities he actually possessess, from a knowledge of his *temperament*, for if his disposition is good, he will have the virtues which most naturally belong to it: and if his disposition is bad, he will have its vices; with regard to the talents however, we can draw more certain inferences.

ARDENT TEMPERAMENT. — GENERAL MENTAL AND PHYSICAL CHARACTERISTICS.

In marked characters this temperament is generally distinguished by darker hair and complexion than usually belong to the phlegmatic temperament. The shape of the head being dependent upon the degree of intelligence, and not on the temperament, we shall

find that the development of the pure intellectual faculties give an *oval form* by enlarging the upper part of the brain, while, on the contrary the increased action of its inferior portion give a *round form* to the skull. But the former is more frequently met with in the ardent than in the phlegmatic temperament: and the lofty brow, combined with the dark and brilliant eye, and sensible and animated countenance, oftener give external indication of talent. United to the firm fibre, the form is generally undersized, compact, vigorous, and active. With a lax fibre it runs into heighth, but never into breadth. The best singers, musicians and dancers are found in this temperament, owing to the strength and perfection of the nervous organization. The senses are more acute and the susceptibility of pain is much stronger in the ardent than in the phlegmatic temperament.

TALENT.

Before I mention the *mental* qualifications that belong to the temperament, I must define

my notions respecting talent: when the mental powers are above the ordinary standard, we give the name of talent to this superiority: in examining the mental phenomena resulting from the difference of the temperaments, I have found that talent is of two kinds: the one has its source in the strength of the *pure intellect:* the other in the vigour and energy of its agent the *brain.* The first is general in its effects, and displays itself in every operation of the mind: the other shews itself more in some faculties than in others, and is considerably influenced by the peculiarities of the physical constitution.* The union of the two kinds of talent increases the perfection of each, owing to the assistance which one derives from the other. It is, in my apprehension, the combination of a strong intellectual power with a vigorous cerebral action that

* The *acuteness* of animals, which is distinct from the involuntary impulse we call *instinct*, is derived exclusively from this source, and the wonderful sagacity displayed by some brutes may be traced to the perfection of the cerebral action, which gives a certain degree of power, quickness, and correctness to their limited faculties.

produces *genius*. Strength of intellect may be found in any constitution, but the talents that result from the activity of the nervous system must be sought in the ardent temperament.

MENTAL POWERS.

The energy of a well constituted brain gives quickness to the perception, liveliness to the imagination, and facility to the operations of the memory : it is therefore the ardent temperament that exhibits these powers in the greatest perfection.

With respect to the feelings, their distinguishing character is warmth and generosity, usually accompanied by irascibility of temper, which is greatly increased by every morbid affection of the nervous system.

THE ARDENT TEMPERAMENT COMBINED WITH A WEAK INTELLECT — INTELLECTUAL CHARACTERISTICS.

Deficiency of intellect, when combined with the ardent temperament, does not bear the appearance of stupidity, in which it differs

totally from the same combination in the phlegmatic constitution. We must even beware of being deceived by the quickness and facility which the perfection of the nervous action gives to the performance of many mental operations, and remember that the test of a good understanding is in the *reasoning faculty*. Sound arguments alone can shew a sound intellect. The power of reasoning well may lie latent, from the want of knowledge, or be overpowered in certain cases by the inordinate action of the feelings: but where it is constitutionally deficient, its absence is observed at all times, for that which has no existence can never be developped.

DISADVANTAGES RESULTING FROM WEAKNESS OF INTELLECT AND STRENGTH OF FEELING.

The distinguishing characteristic of a weak intellect combined with the ardent temperament therefore, is a *natural* want of judgment; which is more injurious in its effects than the stupidity of the phlegmatic character: for in the latter case, the individual often acts

with great propriety, by following established usages, and by profiting from experience to a certain degree. Of all mental constitutions that which unites *weakness* in the immaterial principle, and *strength* in the nervous action, is the least calculated for its own happiness, or that of others; for it is subject to the greatest excess and variety of painful sensasions, both mental and bodily, with the fewest means of defence, that is, with the smallest share of firmness to control the one, and of patience to allay the other. The mutability of the human feelings also, is particularly manifested in this character.—Steadiness depends more upon the regulating power of the immaterial principle, than upon the nature of the feelings themselves—if the impulse of the present moment is habitually obeyed without reference to a settled line of conduct, no dependence can be placed upon the principles or affections: changeable in their direction: as the waves in the watery element, without solidity, without a fixed foundation. The affections of a weak mind are at the mercy of every gale that blows:

if the tide turns it flows perhaps as strongly in an opposite direction, and the bitterest hatred succeeds the tenderest love. In short instability is the characteristic of *mere* feeling. Maternal love alone forms an exception : *this* lies imperturbable in the hidden depths of the human heart, beyond the reach of the warring elements that disturb the surface : some instances may seem to contradict the general assertion, but the character is unnatural, and our subject of analyzation is the mind in its *natural* state. The strongest minds are not always exempt from mutability, for it is not the *positive* quantity of the intellectual power, that gives it preponderance in the mental government, but its proportion to the strength of the passions. We frequently find therefore that an individual of ardent temperament pursues his object with more eagerness but less perseverance than one of a phlegmatic temper, his opinions are more decided, but more subject to alteration ; and his resolutions are more hastily formed and more readily abandoned. With respect to the deficiency of judgment so frequently ob-

served in this constitution, it is hardly necessary to mention that a shallow intellect with strong feelings is, of all characters, the most liable to the formation of erroneous opinions, for each defect is a distinct source of error. The errors which result from the weakness of the mind may be traced 1st, to an incapability of taking a general and extended view of things; 2d, to a liability to be deceived by external appearances; 3d, to a limited power of acquiring knowledge and of applying judiciously what *is* acquired. Those which are the consequences of immoderate activity in the sensitive department are to be traced; 1st, to hastiness of decision; 2d, to the formation of strong prejudices; 3d, to the habit of judging of the feelings of others by our own. Knowledge and experience are indispensable to an individual of this temper, so liable to err, so often blind to his own failings, and so exquisitely susceptible of suffering from their evil consequences.

MENTAL POWERS.

The mental qualifications that may be

found in conjunction with a moderate intellect and a good nervous organization are, a quick perception and a ready memory; and a higher degree of intellect may be accompanied by a lively imagination. From the rapid flow of ideas, result fertility of invention, humour and drollery: from the readiness of the memory, a facility in learning languages: and from the combination of a quick perception with muscular dexterity, result ingenuity, a power of imitation, and an aptitude for the acquisition of brilliant accomplishments.

THE FEELINGS. — GOOD QUALITIES.

The good feelings most frequently found in the ardent temperament combined with a moderate or inferior intellect are the following: warmth of heart, frankness and openness of temper, unsuspiciousness, liberality and disinterestedness, charity, zeal and activity in the service of others, animal courage, an absence of selfishness, a hospitable and friendly nature, strong domestic affections, and frequently an agreable liveliness of disposition.

EVIL QUALITIES.

Irascibility, impatience, petulance, inequality of temper, fretfulness, imperiousness, caprice, vanity, curiosity, indiscretion, loquacity, credulity, rashness, impetuosity, imprudence, extravagance, levity, irresolution, fickleness, jealousy, a morbid degree of sensibility, and violence of predilection and antipathy. In general the feeble mind displays more irritability of feeling than strength of passion, for great passions indicate a certain portion of energy in the mental power.

THE ARDENT TEMPERAMENT COMBINED WITH A STRONG INTELLECT.

It is in this class that we find the highest degree of *intellectual* perfection, for both the material and immaterial parts contribute to the production of the talents. A high degree of *moral* perfection, though by no means incompatible with this character, is far from being its natural attendant, because the sensations are as powerful in proportion, as the

rational powers, and are therefore as difficult to controul as the weaker passions of a weaker mind. Here we must seek for the great virtues and the great vices that belong to our nature.—All is upon a great scale : the passions are impetuous,and the will is determined whether it acts in opposition or in obedience to the sensations. To such a mind sound religious principle is indispensable—secure upon this foundation, it can remain firm and immovable as a rock ; the feelings and passions may assail it with the force and fury of the troubled waves, but they will be broken and dispersed by the shock : while the great intellect that yields to the temptations by which it is beset, presents the melancholy spectacle of a strong and beautiful vessel borne down by the raging billows, and finally overwhelmed in the deep abyss.

PHYSICAL CHARACTERISTICS.

The physical character is usually very strongly marked, for it receives additional expression from the energy of the mind. The

external form may be more or less influenced; but the air, the manner, and the countenance are always illuminated by the intellectual fire that burns within. The complexion is most frequently pale, and the whole appearance either interesting or commanding.

THE FEELINGS.—PASSIONS.

The passions of anger, love, hatred, jealousy, and vindictiveness are, when felt, more violent and impetuous in this character than in the former. Wrath and vindictiveness, though more terrific in their effects, are more temporary in their duration, if the understanding be sound. Of all passions ambition, in some shape or other, is the most deeply rooted, and the most natural to this constitution of mind.

EVIL QUALITIES.

Irascibility, impatience, irritability, variableness, and violence of temper, want of pru-

dence and moderation: in some cases eccentricity, fastidiousness, discontent, ardour of pursuit, followed by weariness and disgust.

GOOD QUALITIES.

Magnanimity, generosity, courage, and intrepidity, candour, liberality, sensibility, true dignity, elevation, refinement, and delicacy of sentiment, determined resolution, heroic self-devotion, a high sense of honour and spirit of independence, noble enthusiasm, love of glory, ambition of excellence, charity, and piety, pure and ardent, and exempt from superstition and bigotry.

INTELLECTUAL CHARACTERISTICS.

Strength of intellect combined with vigour in the cerebral action gives the quickest perception, the strongest memory, and the highest power of the imagination. From the rapid flow of ideas compared, combined, and analysed by the mind with quickness and extraordinary facility, result

wit, originality, and readiness of invention; keenness of observation, and a restless spirit of investigation usually attend it. To this class belong the greatest poets, wits, and orators; some of the most valiant heroes and mighty conquerors, and many of those whose crimes and splendid actions fill the pages of history: in short, all the extremes of the human character are found in this temperament. The only faculty whose perfection is diminished, instead of being increased by the nervous energy, is the judgment. As the power of judging correctly does not only depend upon the strength of the understanding, but also upon the capability of taking a cool and dispassionate view of things, the greatest mental powers when united to the ardent temperament are often insufficient to secure the judgment from failure in points that deeply interest the feelings. Strong minds are therefore liable to error and prejudice when their sensations are equally strong; but their prejudices, unlike those of weaker intellects, are *removable:* for when the feelings are hushed, the reason

resumes her empire. A change of opinions in this case does not therefore shew the fickleness of a volatile temper, but the candour of an enlarged understanding; while the tenacity of weak minds is a mark, not of firmness, but of obstinacy.

FORMATION OF OPINIONS IN THE TWO TEMPERAMENTS.

With respect to opinions, the ardent temperament in combination with every degree of mental power is apt to run into extremes: thus the weak mind is given to bigotry and superstition, while the strong intellect, though susceptible of the most exalted sentiments of piety, sometimes displays the coldest scepticism. This difference in the effect is partly attributable to the natural timidity of of a weak mind, and the natural fearlessness of a strong one; the martyr and the infidel must both possess mental courage; the trembling bigot yields to feeling, without venturing to consult the reason. The scepticism of a *phlegmatic* temper often arises

from indifference, which prevents all examination of a subject, or from pride, which will not allow us to believe what we do not comprehend. The doubts of the opposite temper frequently spring from a morbid fear of being deceived, and *these* are more easily dispelled, because they are attended by a spirit of investigation.

SPECULATIONS OF PHILOSOPHERS.

It seems strange that the noblest powers of the mind should give birth to the most extravagant notions, and yet it is the kind of intellect now described that produces the wildest hypotheses, and most irrational systems. This is also attributable to the want of moderation, and the ardour of imagination that naturally drives a brilliant intellect to the extreme point in every theory. Indeed, the energy of the nervous action sometimes gives such force to the imaginative faculty that it entirely overrules the judgment, and in such constitutions a morbid state of the brain not unfrequently brings on insanity.

PHLEGMATIC TEMPERAMENT.—GENERAL MENTAL AND PHYSICAL CHARACTERISTICS.—MENTAL POWERS.

The distinguishing characteristic of the temperaments, considered independently of the influence of the pure intellect is, talent in the ardent, and dullness in the phlegmatic temperament. Whatever share of talent is possessed by the latter must be derived entirely from the active powers of the intellect; for it obtains little or no assistance from *nervous energy*. A deficiency of intellect in the phlegmatic temperament must therefore produce absolute stupidity. The first gradation above stupidity displays a plain, straightforward understanding, entirely destitute of imagination: this forms the class of the *ennuyants*. The next degree shews good sense, with a quicker perception, and a more lively imagination; but still the operations of the intellect are slow, and performed with difficulty, owing to the sluggishness of the brain, and the weakness of the memory. As

we advance, the feebleness of the mechanical action is compensated by the increase of intellectual power: its highest degree of perfection shews a clear understanding, a sound judgment, an acute discernment, strong powers of reasoning, and a mind vast and comprehensive, noble and elevated. Here the habit of methodizing and analyzing assists the memory; the systematic arrangement of the ideas aids the reasoning faculty; the absence of passion gives correctness to the judgment; and the coolness and deliberation with which all the mental operations are performed give clearness to the discernment. Nevertheless the brilliancy of talent displayed in the ardent temperament cannot be attained in the phlegmatic; for, supposing the powers of the intellect to be equal, the latter must always lack the fire and energy which give force and rapidity to the operations of the former.

FEELINGS.

As the two temperaments are characterized

by *quickness* in the one, and *dullness* in the other, in the department of the talents, so they are distinguished by *warmth* and *coldness* in the department of the feelings. This only refers to the animal character: the operation of the intellect restrains the one, and rouses the other. In the phlegmatic character the sensations are more under the control and direction of the intelligent power, and the conduct is more easily regulated than in the ardent temperament: consequently the most *faultless* characters generally belong to this class. Nevertheless I consider the balance of moral evil as laying on this side; for though the errors are fewer, they are more inexcusable, not only because the faults do not admit of so much palliation from the natural violence of the sensations, but also because they are derived from a worse origin, viz. *selfishness*; and from this foul source proceed the most evil feelings of which our nature is susceptible. Let us examine in what manner it forms part of the animal character of man, how far it is innate, and why it is more usually the attendant

of the phlegmatic than of the ardent temperament.

DEFINITION OF SELFISHNESS.

We have a natural aversion for painful, and a natural wish for pleasing sensations, both moral and physical. We therefore endeavour to avoid whatever causes the one, and to seek whatever produces the other, as far as lies in our power. The feeling is in itself innocent and allowable; indeed, it forms part of our nature, and cannot be destroyed; but it may be so strong as to overcome every consideration for the comfort and happiness of others—this excess is selfishness, which, if not repressed, draws us more slowly, but more irrevocably in the path of vice, than the violence of passion. By degrees, all that opposes our gratification becomes hateful; we acquire an aversion for all those who may interfere with this object by their own views, their authority, or even their existence; the feeling grows more insatiable by indulgence; we end by over-

throwing every barrier that opposes us, and by perpetrating every crime that is necessary for the accomplishment of our designs. Such is the course of the cold-blooded villain; and if I were to decide upon the temperament of Satan, I should pronounced it to be phlegmatic.

SELFISHNESS INNATE.

Selfishness, as far it consists in an immoderate desire for self-gratification, is innate, and forms part of the animal character which may be easily observed in children; but the evil feelings which frequently accompany extreme selfishness grow from it by the culpable operation of the mind, in consequence of the opposition which the passions of others present to our views and wishes—we bring into the world an unreasonable desire to *please ourselves*, but not to *injure others:* The malignant passions are what I call spiritual vices, and have not, like irascibility, cowardice, gluttony, etc., their origin in the nervous constitution. Hatred, malice,

revenge, and envy form part of the black catalogue. Of all these revenge is the most natural, and envy the least; because it is a painful feeling excited by the happiness of others, even when it does not interfere with our own. I therefore look upon it as the climax of spiritual depravity.

SELFISHNESS THE MORE USUAL ATTENDANT OF THE PHLEGMATIC CHARACTER.

Selfishness is more usually the attendant of the phlegmatic than of the ardent temperament; because it is more compatible with deficiency than with excess of feeling, and it is of course more likely to inhabit a *cold* heart than a *warm* one. The ardent temperament is also more susceptible of mental and bodily pain than the phlegmatic; and we generally find that those who have suffered most know best how to feel for others.

GENEROSITY NOT CONFINED TO THE ARDENT TEMPERAMENT.

I am far from asserting, however, that gene-

rosity of feeling exclusively belongs to the ardent temperament: on the contrary, it is in the phlegmatic character that sensibility is the most pure and disinterested, when it *does* exist, because it is free from passion, and from any view to selfish gratification. But then we only meet with it in minds of a certain cast, whereas sensibility *pervades* the ardent temperament, owing to the superior delicacy of the nervous organization: in one temperament it is constitutional, in the other it is not.

DEFINITION OF SENSIBILITY.

This will be best understood, by defining the term sensibility. It is, I apprehend, the combination of a quality of the mind, and a peculiarity of the nervous constitution. When a benevolent turn of mind is united to a strong nervous susceptibility, it constitutes genuine sensibility. Benevolence, without delicacy of feeling is mere goodnature: susceptibility of feeling, without benevolence, is mere irritability.

SENSIBILITY OF THE ARDENT TEMPERAMENT.

Genuine sensibility most naturally belongs to individuals of ardent temperament and powerful intellect. The weaker the mind, the more it assumes the character of nervous irritability; and this causes us to feel more keenly for ourselves than for others. True sensibility may be met with in phlegmatic individuals of high intellectual powers; otherwise this constitution is seldom troubled with any stronger sentiment than goodnature. Goodnature is, however, the first degree of sensibility; for it is a feeling of general benevolence—a feeling that leads us to sympathise with our fellow creatures in their grief and joy; and to alleviate the one and contribute to the other, as far as lies in our power; but the sympathy is neither deep nor permanent, and the good will is too indiscriminate to call forth much corresponding sympathy. We find four different kinds of sensibility in the four different classes of character.

SENSIBILITY OF THE STRONG MIND AND ARDENT TEMPERAMENT.

First, the sensibility of the strong mind combined with the ardent temperament, which is of the source of all the *natural* great qualities of the mind, that is, of the qualities that are born with us, and that develop themselves before external causes operate any change in the disposition:—an innate love of truth, a high sense of honour, and an exquisite delicacy of feeling adorn this lofty character—enthusiastic in friendship, devoted in love, magnanimous in enmity, generous and humane to all suffering beings—this favourite of nature is formed to command admiration and captivate the affections. But long-continued happiness seldom falls to the share of so susceptible a being; and in a world of cares and troubles the joys of life can only serve to brighten his horizon with a transient light, as the aurora borealis illuminates the northern skies with a temporary splendour—deep, tender, and impassioned, this kind of sensibility is too apt

to prey upon the heart that harbours it, and to wear out the constitution by exhausting the nervous energy.

SENSIBILITY OF THE WEAK MIND COMBINED WITH THE ARDENT TEMPERAMENT.

If the exalted sensibility of a great mind be a fatal gift, how much more detrimental to the happiness of its possessor is the susceptibility of a narrow mind combined with the ardent temperament! The feelings are keener, the power of regulating them weaker, and the capability of sublime enjoyments, which is some compensation to an elevated mind, is totally wanting: to which may be added, that the morbid irritability of the body, especially of the stomach (that scourge of the ardent temperament) is borne with less patience. In this character, the acuteness of the sensations creates an eagerness for the gratification of every wish, that gives a certain degree of selfishness, though this quality is not natural to the ardent temperament, and it causes an impatience under the slightest opposition, that is

one of the chief causes of ill temper. Ill Temper! thou troubled and harrassing spirit, sent by the enemy of mankind, to blast all who yield to thy influence! who keepest more than half of the human race within thy dark and stormy dominions! what an abode of peace, and joy, and love would this earth be, if thou wert only exterminated! Villains and their crimes only disturb us at times, as tempests obscure the summer sky; but where thou spreadest thy dusky wings, the brightness of the daily sun is lost, and the flowers that spring up in the thorny path of life are blighted under thy baneful shadow! Unfortunately, this quality does not belong exclusively to the weak and narrow minded: the most highly-gifted mortals are liable to irritability, especially if harrassed with chronic diseases, but in this case it is usually accompanied by generous feelings, while, in the former, it is apt to shew itself implacable, blind, tenacious, and incorrigible; increasing in acrimony with increase of age. The reflexion and experience of years often calms the turbulent passions of a strong mind at the decline of life; when all

earthly things are passing away, the storms of the world cease to darken the mental horizon; their thunders roll at a distance; and the decaying light of a great intellect sinks, tranquil and unclouded, with all the softened splendour of the setting sun. We have now considered the defects that often attend *mere nervous* sensibility, which is certainly an enemy to inward peace, productive of vehement and ungovernable passions, of a jealous and unreasonable wish to monopolize all the affections, of a vain conviction of a superior delicacy of sentiment, and of all the evils that result from the ascendancy of the imagination over the judgment.

PHLEGMATIC TEMPERAMENT WITH MODERATE CAPACITY.

We can hardly find a greater contrast to the nervous irritability of a weak and ardent mind than the calm and placid feeling of general benevolence that constitutes the sensibility of a plain phlegmatic; supposing the goodness of heart, and the capability of the understanding to be equal in both indivi-

duals, the surface of their minds will present as different an appearance as the smooth summer lake reflecting the soft beams of an unclouded moon, and the restless ocean fretting upon a rocky shore in a stormy latitude. Natural, cheerful, and unpretending, obliging without effort, and without display, goodnature is always pleasing, though its indiscriminate application diminishes its value in our eyes; for I believe that we would rather be harrassed by those who love us *exclusively* than made easy and comfortable by attentions that must be enjoyed in common with others.

PHLEGMATIC TEMPERAMENT COMBINED WITH A STRONG MIND.

The sensibility of a high-minded phlegmatic, at once rational and tender, is *formed* by the reason and the imagination: it is not a natural quality, but a superstructure raised by these faculties upon a foundation of innate benevolence. This kind of sensibility, which is rare, because it does not belong to the

natural character, may easily be distinguished from every other by the period of its development, for it appears after the reason is matured, and it gains strength with increase of years ; whereas mere goodnature and nervous sensibility shew themselves in early infancy, and lose their warmth (the latter at least) when the feelings are blunted by age. If we could look for *true* happiness, which can only be obtained in proportion to our capability of bestowing it upon others, we must seek it in this beautiful combination of diffused benevolence and particular affections ; in this angelic feeling of love and charity to every fellow-creature, guided by the reason to every useful purpose, without the least reference to self, and accompanied by an unaffected simplicity that neither seeks nor shuns the attention of the world, to which it is indifferent, only looking to the approbation of the Father of Mercies, and the eternal reward of the just. If the human mind can be imperturbable, it must be where successful benevolence produces a sublime feeling of satisfaction, and ingratitude rouses pity ra-

ther than indignation; where every sentiment of anger and impatience is extinct, and that we say, with the angels in all sincerity, and at all times, "Peace, goodwill towards men."

From this explanation it will be sufficiently evident that I have no intention of utterly denying sensibility to the phlegmatic character, nor indeed can I deny some portion of selfishness to the ardent temperament; for bad tempers may be found combined with every degree of intellect, and those who indulge irritable feelings at the expense of the feelings of others are certainly selfish so far. Hence generosity and selfishness sometimes exist in the same character: this may seem paradoxical, but it is only one of the innumerable inconsistencies of our nature.

ADVANTAGES BALANCED IN EACH TEMPERAMENT.

Hitherto I have seemed to bear hard upon the phlegmatic temperament, but I do not suppose that merit belongs to one constitution rather than to the other—each possesses its own peculiar advantages and disadvan-

tages. If the vices of the phlegmatic temperament are of a darker hue than those of the ardent, its virtues are of a more pure and intellectual cast: if the malignity of the phlegmatic character is more iniquitous than the violence of an ardent spirit, the virtues of a mind superior to every passion, acting habitually from moral and religious principle, and in the full and uniform possession of its own powers, commands more respect, though perhaps less love, than the natural goodness of a warm heart, whose impulse is partly involuntary. Kind feelings are, it is true, most natural to the ardent temperament, springing spontaneously therein, as fragrant shrubs spread in the wildest luxuriance under the influence of a tropical sun; but good principle can supply their place in a colder constitution, and lead us further and more steadily in the service of others, than even the most refined sensibility, unless this be aided and regulated by a very sound judgment. A high degree of sensibility under the *complete* controul of the intellectual power would constitute perfection: such a combi-

nation of the noblest attributes of each temperament, does not belong to the nature of man; but it was the character of our Divine Model which we must endeavour to imitate, by curbing our feelings, if they are violent, and by forming and elevating them, if they are deficient. The last duty may to some appear impossible; but there is no imperfection which the mental power, vigourously exerted, may not remove with the Divine assistance. Under the influence of high motives, our spiritual part may overpower the animal nature, and, by its constant operation, *create* sentiments pure and noble, and worthy of an intellectual being. The phlegmatic character possesses the capability of being *moulded* by the rational powers; the feelings of which it is susceptible are not violent, but steady and deep; they are more equable, and consequently productive of more tranquil happiness to the objects on whom they are bestowed, than those which appertain to the ardent temperament. The latter, indeed, shew more passion, and raise stronger emotions, but strong emotions do not constitute

true happiness: the sparkling flame that expends itself in blazing to the skies, and the impetuous torrent that pours its waters for a season through the arid plain, are far less useful than the silent and steady sunshine that illuminates each day of our existence, and the gentle current that bears us smoothly on in its tranquil bosom.

PHYSICAL CHARACTERISTICS OF THE PHLEGMATIC TEMPERAMENT.

The phlegmatic temperament is distinguished by light hair, eyes, and complexion. This physical attribute pervades it throughout, except where a modification has been produced by intermarriages between the two temperaments. In this case, the characteristics of each are softened and blended, and sometimes, but rarely, the physical distinctions of the one, are joined to the moral and intellectual character of the other. The complexion excepted, a greater variety may be observed in the physical characteristics of the phlegmatic than of the ardent tempera-

ment. In combination with a firm fibre, it exhibits athletic strength, and the giant belongs to this temperament, while the dwarf is more frequently found in the other: when, on the contrary, it is united to a lax fibre, it shews weakness in every degree. The first combination is best exemplified in a heavy English clown: as the individuals in this class generally intermarry, they are more likely to shew the peculiarities of the constitution in all its purity: here, the round head, the dull eye, great ears, low forehead, clumsy form, and above all, the flat instep, proclaim the phlegmatic temperament without intermixture. A good-humoured corpulency and the glowing hue of health are its frequent accompaniments, for physical strength and a placid temper can hardly fail to produce a wholesome embonpoint; the freshness of youth is also preserved longer, owing to the absence of irritability. The senses are often dull, but this arises more from a tardiness of communication between the external organs of sense and the sensorium, than from any organic defect: the length of the interval,

which I have marked distinctly, I ascribe to a sluggishness in the motion of the nervous fluid. When the phlegmatic temperament is united to a lax fibre, and runs into *length*, it exhibits more gentility in the external appearance; the form is more slender, the head smaller, the limbs more delicate, and the activity resulting from a light and supple frame, supplies, in some measure, the place of strong muscles and large bones. The characteristics of the phlegmatic temperament, thus softened down, are more suitable to the female than to the male sex, for they may combine all that makes woman lovely. The eye of heavenly blue, the light brown hair, the complexion of lily white, mingled with the soft tints of the rose, the round limbs and slender shape, and the angelic sweetness of a countenance unruffled by the storms of passion, which constitute the charms of a northern beauty, are irresistibly attractive.* At the same time, the phleg-

* Such is the wife that a prudent man ought to choose; for the most rational expectation of a constitutional quiet temper is derived from a fair complexion, unless some confusion in the hereditary qualities has arisen in conse-

matic temperament is by no means incompatible with manly beauty, when it exhibits the majestic mien, noble stature, and calm dignity of a Hercules, and can be likened to "Il leon che posa," as Dante would express it: but this style of figure and appearance is as rare as the happy combination of strength and tranquillity which it denotes.

THE PHLEGMATIC TEMPERAMENT COMBINED WITH A WEAK INTELLECT—INTELLECTUAL CHARACTERISTICS.

Dullness of perception, weakness of memory, total want of imagination; the ideas are few, and the notions are formed with slowness and difficulty. From the imperfection of the intellectual and mechanical action results every degree of stupidity, down to idiocy, which shews a morbid deficiency of the cerebral power.

quence of cross-marriages. Above all, I would recommend it to all those who value a peaceful life not to select a short woman, with black hair and a strong fist.

THE FEELINGS—GOOD QUALITIES.

Mildness, gentleness, meekness, goodnature, evenness of temper, contentedness, humility, patience, taciturnity, industry, frugality, an exact but often mechanical performance of the moral and social duties, and the absence of every violent feeling.

PASSIONS.

Avarice is as much the constitutional passion of the phlegmatic as ambition is of the ardent temperament; but it is seldom found in combination with a strong intellect. It is the *only* passion of a feeble phlegmatic mind, the feelings in general being too weak to come under that denomination, except in some few hearts so thoroughly ill-disposed as to harbour envy and cold malignity.

EVIL QUALITIES.

Here we may find the greatest degree of selfishness, sensuality, covetousness, sullenness,

obstinacy, ingratitude, and insensibility; a weak and indolent disposition, and a total want of mental as well as bodily energy. The temper, though not irascible, wants generosity, and when once offended, is not easily appeased; for placability can only be the virtue of a strong mind or a warm heart, unless it is created by the power of religion. Low cunning, and a propensity to thieve and to lie, are sometimes to be met with, but this may result from a bad education and narrowness of intellect, in either temperament. The defects of the phlegmatic character are most apparent in uncivilized man; who exhibits a sullen ferocity, mingled with cowardice and cold blooded cruelty, instead of the fierce and heroic courage of the savage of ardent temperament.

THE PHLEGMATIC TEMPERAMENT COMBINED WITH A STRONG INTELLECT—PHYSICAL CHARACTERISTICS.

The energy which is derived solely from the strength of the intellect, and not from the constitution of the nerves, cannot be supposed

to modify the external form; we even find that a great mind, in this case, may animate a frame of the most unpromising appearance, but the countenance will reflect the benign intelligence and dignified composure that reigns within us, as in the opposite temperament we see the animated and ever-varying features illuminated by a soul of fire.

INTELLECTUAL CHARACTERISTICS.

The mental powers in this constitution are more characterized by solidity than brilliancy, and their mode of operation may be described by the motto "slow and sure." The perception is clear, the judgment sound, the reasoning faculty strong; the imagination participates in the strength of the other intellectual powers, but though it may be *fertile* it cannot be *lively*, unless it is animated by a combination of the two temperaments. Wit derives so much assistance from the rapidity of the cerebral action, that we never find it in a constitution totally destitute of nervous energy, and the inventive power of the purely phlegmatic brain is always of a serious cast.

It is in this character that we usually find fortitude, justice, temperance, prudence, discretion, probity, cool and steady courage, firmness of purpose, unwearied perseverance, unshaken constancy, inflexible integrity, universal charity, candour, forbearance, equanimity, purity of mind, habitual serenity, calmness and moderation in prosperity, resignation in adversity, and an equal, mild, and rational spirit of devotion: to which are sometimes added, feelings profound and unchangeable, lying too deep to be within the reach of common observation. Here truth and honour find a secure foundation in conscience and principle, while, in the ardent temperament, they have sometimes no other support than good feeling, which is not calculated, from its nature, to form the sole prop of human virtue.

EVIL QUALITIES.

If the disposition is unamiable, it shews selfishness, pride, haughtiness, reserve, frigidity,

sternness, implacability, tenacity of opinion, uncharitableness, hypocrisy, suspiciousness, want of liberality combined with ostentation, and the absence of every generous sentiment. When angry feelings arise, they have their source in wounded pride or disappointed selfishness. The passion of anger does not then burst forth with fury and vehemence. It shews itself by the cutting sarcasm, the bitter taunt, the cold sneer, the merciless reproach, or it is concentrated and broods in sullen silence, within the dark recesses of the soul.

OBSERVATIONS — VARIETY OF CHARACTER IN THE PHLEGMATIC TEMPERAMENT.

The phlegmatic temperament contains a greater variety of characters than the ardent; because the reason frequently effects great changes in the feelings of the former, while those of the latter, in general, only require to be *moderated.* In the phlegmatic temperament, the intellectual and animal parts of our nature are sometimes characterised by *opposite* qualities, and the mere development of the

understanding has often effected such an alteration in the disposition, that the boy has been scarcely recognizable in the man. The natural operation of a good intellect is to elevate the mind, and instances have occurred within my own observation, in which selfishness, sensuality, duplicity, and pusillanimity have been entirely superseded by disinterestedness, sincerity, courage, and temperance. A *partial* change causes great inconsistencies in the internal feelings, if not in the external conduct. Of all characters this is the most difficult to understand: when the constitution is phlegmatic, and the judgment directs the actions and governs the feelings, the natural disposition may escape the penetration of the keenest observer, while the ardent character stands revealed to every eye; that is, with respect to its qualifications; for discretion is by no means incompatible with it when the intellect is good.

ANIMAL CHARACTER HEREDITARY.

Such, in my opinion, are the general effects

of the nervous influence, upon the character; many errors may have crept into the enumeration of the attendant qualities, but with respect to the hypothesis, every observation during a course of years has strengthened my conviction of its correctness.

I have only to add, that the ardent and phlegmatic characters are *hereditary*, that is, as far as they are influenced by the nervous action. The talent which often prevails through whole families once led me to suppose that the powers of the immaterial principle were inheritable; but this opinion, which to me was always unsatisfactory, has given way to the belief that family talent is attributable to the inheritance of the nervous constitution, and need not imply any transmission of the pure intellectual powers. The physical constitution is certainly hereditary, and if the energy of a well-constituted brain gives facility to the mental operations, we may attribute family talent to the transmission of *family brains*, especially as it is observable that the powers thus inherited are precisely those which derive the most assistance from the cerebral

action. The inheritance of the character is more evident in the brute than in man, because it does not, as in a rational being, undergo any change from the development of an intelligent power; besides which, each temperament runs through a whole species (except in the horse, the dog, and the monkey tribe), while man exhibits each of the two,* and a mixture of *both*, from intermarriages. In general, the best, because the most moderate characters, result from the union of families differently constituted; when both the parents are phlegmatic, the progeny is generally dull, and destitute of natural talent; when both are of the opposite character, the offspring frequently surpasses them in vehemence of feeling. Most usually the effect produced by the union of opposite characters is a difference of temperaments among brothers and sisters. In this case the physical attributes of one temperament are *sometimes*

* Might we not account for this by supposing that Adam and Eve were of different temperaments? In this case, some of their progeny might inherit the one, and some the other.

combined with the mental attributes of the others, both shewing a milder cast of character.

The same temperament may be traced through a whole nation, when it is not of a mixed origin. Generally speaking, we find that the inhabitants of warm latitudes are of the ardent temperament, and those of cold and damp climates, phlegmatic. But the nature of the temperament cannot be entirely attributable to climate; for I have observed that families preserve their own distinguishing characteristics through succeeding generations in every climate. Thus the northern and southern Irish, who are of a different race, still shew a great difference of character, though inhabiting the same latitude: the first are of Scotch origin, and the latter are supposed to be a colony from Spain, which their warmth of temper renders, I think, not improbable.* The English, who derive their origin from several nations, perhaps exhibit

* The Scotch phlegm, however, is confined to the Lowlanders—the Highlanders are of the ardent temperament.

a greater mixture of temperaments and variety of character than any nation under the sun, but the phlegmatic certainly predominates. The ancient Britons were of the ardent temperament (as the Welch temper can testify), and also the Normans; but the Saxons and Danes were of the opposite constitution. The Spaniards, Portuguese, Italians, and Greeks,* are of the ardent temperament; the Germans, Swedes, and pre-eminently the Dutch, are phlegmatic.

PARALLEL BETWEEN THE ARDENT AND PHLEGMATIC TEMPERAMENTS.

The advantages and disadvantages of the two temperaments seem to be nearly balanced. The ardent temperament gives more facility to the attainment of intellectual superiority, and the phlegmatic to the acquisition of moral qualification, because the *strength* of the nervous action gives vigour to the mental operations, and waywardness to the feelings,

* The ancient *Thebans* were phlegmatics.

and its *feebleness* produces the opposite effect. The intellect never blazes forth with such splendour in the phlegmatic as in the ardent temperament; but the reason gives a more steady light, by which the mind is better enabled to avoid the errors resulting from prejudice and from enthusiasm. Indeed the weakest mind may pursue its course in the path of virtue and truth with more security in this temperament, by the help of the humility, meekness, and resignation, which are its characteristic virtues. Perhaps we might, at a first view, be tempted to give the preference to the phlegmatic constitution from these considerations; and so we ought, if the other was compelled to retain its imperfections; but this is far from being the case, and as merit is proportioned to exertion, the balance even preponderates in favour of the ardent temperament, when its powers are directed to the correction of constitutional defects: the task of the phlegmatic character being more easy, it is more responsible, and its faults are less pardonable. The latter labours under this disadvantage, that, although

it may be equalled by the ardent character in moral perfection, it cannot in return equal it in intellectual attainments, even supposing the intellect and the exertions to be as strong; for the best workman can never execute so good a work with blunt tools as one of the same ability with excellent instruments. However, when the physical constitution is sound, and the intellect powerful, the deficiency of the nervous action is sometimes too trifling to produce any very sensible effect; it is disease that displays the difference in a striking manner, by increasing the irritability of one constitution, and the langour of the other.

COMPARATIVE HAPPINESS.

There is one point, however, in which the phlegmatic individual has the decided superiority, that is, in the possession of *this* world's happiness. My assertion will, I think, easily admit of proof. When pleasure and pain are felt keenly, the portion of suffering must exceed that of enjoyment, because we are

most liable to moral and physical pain, not only from the present constitution of this world, but from our own perverseness and want of judgment. Again, every rational mind will acknowledge that violent and tumultuous sensations, even of the pleasureable kind, do not produce true happiness, and that the excess of joy is even painful. The calmness and habitual serenity of the phlegmatic character (supposing it to be wel disposed) is far preferable to the strong emotions produced by the gratification of the most ardent wishes; and who does not perceive that the more eager are the wishes, and the more exquisite the satisfaction, the greater is the dread of losing the blessing we possess, and of seeing what no human power can retain escape in a moment from our grasp? The moderate and reasonable enjoyment of what is granted to us, and an habitual preparation for the hour of trial, when it may be withdrawn, can hardly be expected from a mind possessing acute sensibility; while the well-regulated phlegmatic character enjoys a peace and tranquillity which is, in a

great measure, independent of external circumstances, because it arises from the habitual subjection of the feelings to the government of the reason.

CONCLUSION.

Moral inference.—The conclusion which we may draw from this general view of the human character is, that our advantage is in proportion to the preponderance of the intellectual power over the moral and physical sensations, and that all our exertions must be directed to the acquisition of this spiritual dominion. Man seems to be a compound being; not merely a being possessing a body and soul, but one in whose mind two different natures are united, viz. an animal and an intellectual nature.* We possess many feelings and inclinations in common with the animal creation, and in proportion as the

* It has been seen that I refer this combination to the department of the feelings, which I define to be sensations of peculiar kind concatenated with certain ideas.

immaterial principle gives way and is governed by the sensations, or rules and directs them, we descend towards the brutish, or rise towards the angelic nature. The pride of man disclaims all relationship with animals; but as we are too apt to imitate them by following the impulse of our feelings, without consulting our reason, it is better that we should be aware of the connexion, that we may make it as distant as possible. It is not by acknowledging that we *have* animal qualities, but by weakly yielding to their influence, that we degrade ourselves; and it is when we consider our natural disposition as a sufficient excuse for the violence of our conduct, that we forget our true rank, and do injustice to the powers of the will and the understanding. The strength of the will is usually proportioned to the violence of the character; for we find that those who have strong passions can shew a determined will in overcoming every obstacle to indulge them. Why not employ this resolute disposition in *opposing* them? But unfortunately the motives placed in the opposite scale are

seldom sufficiently weighty to overbalance the violence of the sensations. Here we may see the utility of religious feeling, which is always sufficient, if it is *sincere:* while prudential considerations, and even the strongest earthly affections are too weak to stem the torrent of the passions. The duty of self-controul is imperious and indispensable; brutes alone are incapable of governing themselves; but their passions and inclinations are regulated by instinct, and are given for the express purpose of directing their actions; whereas ours are chiefly intended as a means of trial and temptation in our course of moral discipline through a life of probation. The soul of man is not formed for a state of vile subjection to the moral and physical sensations. Let us therefore use to their utmost extent the noble privileges that give us an elevated rank in the creation, and that enable us to trample upon our animal nature, and to qualify ourselves for our future glorious destination.

APPENDIX.

Note I.—p. 14.

The "Exposition of the Natural System of the Nerves," published by that most acute of physiologists, Charles Bell, in 1824, has now thrown additional light upon this part of the subject, both as shewing that the operations of sensation and motion are not carried on by the same part of a nerve, and that the nerves form *four* different systems in the body. And first with respect to the texture of a nerve:—"It is," says Mr. Bell, "a firm white cord, composed of nervous matter and cellular substance: the nervous matter exists in distinct threads, which are bound together in the cellular membrane; they are supplied with arteries and veins, and derive their sensibility from the blood. A nerve then consists of distinct filaments; some serve the purpose of sensation, some of motion, and some go to the muscles of respiration. The same filament does not serve two purposes." Mr. Bell asserts, "a great part of the nerves are not single nerves possessing various powers, but bundles of different nerves, the filaments of which are united for the convenience of distribution, but yet as distinct in their office as their origin; that the perception of an idea depends on the part of the brain to

which the nerve is attached, and that the functions of the cerebrum and cerebellum are different."

As to the division of the nerves, Mr. Bell states that, "Besides the nerves of vision, smell, and hearing, four different systems are distributed through the body, namely, those of sensation, voluntary motion, and respiratory motion, and those which, neither conveying sensation in the ordinary meaning of that term, nor volition, nor causing respiratory action, unite the body into a whole, and are essential to *nutrition*, and generally to animal existence. Mr. Bell describes the spinal marrow as being composed of six columns—three in each lateral portion; an anterior column, which is for the function of voluntary motion; a posterior column for sensation, and a third between them for respiratory functions. (The division of the nerves into four systems, instead of two, which I had adopted from Bichat's "Physiology," does not in any way affect my subject of discussion.)—It seems that the regular nerves are double; i. e., contain filaments for the purposes both of volition and sensation; but there are irregular nerves, which are superadded to these, and which are single in their root and in their operation; two of these must be united in their course or final destination to cause both sensation and volition. It is of importance to know that the nerves of the brain are single, except the fifth, which is the sole nerve of sensation for the face—for if the seventh pair, which is allotted only to motion, be divided for the tic douleureux, it will produce loss of motion in some parts, causing deformity, without obtaining the desired object, viz. destroying sensibility.

Note II.—p. 15.

Since writing the above, Mr. Bell has shewn that the ganglions were necessary appendages to the roots of all the nerves whose office is to bestow sensibility. He shewed that thirty-one nerves went off in regular succession from the brain and spinal marrow, similar in their composition and in their functions; that they had each two roots; one bestowing the power of motion, and the other sensibility; that the *tractus motorius* was a column extending from the origin of the third nerve to the termination of the spinal marrow, and that all the nerves that went off from it were muscular nerves. He proved that the fifth pair of nerves was the source of sensibility to the head and face, and to all the interior parts of the head; that the two nerves to the face were different in functions, the one being a branch of this fifth, and therefore the nerve of sensibility; and the other a nerve without a ganglion, or muscular nerve, and by decisive experiments, he proved that when the one was cut, sensation was taken away, and when the other was cut, the parts were deprived of motion.

Notes III. and IV.—p. 66.

At the time that I wrote this Essay (begun in 1818), my conviction that any surmises respecting the existence and electric nature of a nervous fluid would be treated as visionary, made me fear to let them see the light. My expectation that new discoveries would tend to remove this prejudice has since been realised; but my anticipations will doubtless share the inglorious fate of prophecies made after the event: it has, however,

given me courage to make them known. The French physiologists, Messrs. Prevost and Dumas, have expressed their opinion, supported by a number of delicate experiments, that muscular contractions result from the action of a *nervous fluid*, which, if it be not the electric fluid, possesses at least the same properties, and the analogy that exists between the phenomena of secretion and those produced by the action of an electric pile is, they say, very remarkable: for when an electric current traverses a liquid containing salts and albumen, serum for example, an acid will be produced at one end of the pile, and an alkali at the other; and the animal substances the liquid contains change their natures. Now this is precisely what takes place in the organs of secretion: though secreted entirely by the blood, the liquids these organs contain differ from it in their chemical properties. If it could be ascertained that some organs acted as the positive, and others as the negative pole of the electric apparatus, many remarkable phenomena could be accounted for, they say; "but of this," says Mr. Milne Edwards, in his excellent elementary work on Physiology, "proofs have not yet been obtained. The recent experiments of Mr. Becquerel on the influence of electricity upon the vegetation of plants, support the opinion at present entertained by physiologists, that the nutritive, as well as the muscular movements of the living body, are carried on by a nervous influence analogous, and perhaps identical, with the physical force that produces the electro-chemical phenomena." To these surmises I can now add the fact, that the hand of a remarkable personage (of the name of Molteno), now operating in Paris, pours forth *electricity*, which being, as it appears, modified in the human frame, cures by friction all diseases caused by

a deficient or irregular action of the nerves. The singular power of imparting an electricity thus adapted to the human constitution enables him to restore the equilibrium of a disordered nervous action; to renovate the capability of moving to limbs completely paralyzed; to relax contracted muscles; to impel the blood in its proper direction; and to impart the strength that results from a sufficient supply of nervous energy, or, I should say, of nervous fluid.

In tracing effects to their causes, I would ascend another step, and hazard a conjecture on the nature of electricity itself; but the subject being still more remote and obscure, the hypothesis is presented with even more diffidence. The element of *fire*, the only element which, it should seem, remains in its perfectly pure state, appears to me, in its various *known* forms of light, heat, and electricity, to be matter in its subtlest state, producing its phenomena by the laws of *gravitation reversed*—its distinguishing attribute being that, while all other matter tends from the circumference to the center this tends from the center to the circumference—but with a velocity, and, consequently, a force immensely superior to gravity—which velocity can perhaps be calculated by the time which the sun's rays take in reaching the earth, viz. eight minutes.

Whatever phenomena seem to oppose this explanation result, in my opinion, from the attraction of the two electricities for *each other*. On this point I would add the conjecture, that one object in the existence of *two* electricities (the combination of which is required to produce caloric) is to allow an element so dangerous

from its force to remain latent when in a divided state.* This appears to me to be an indispensable precaution; for it is evident that fire exists in all bodies, and though the causes which draw the particles of matter towards each other are in constant operation, were an impulse so far exceeding them in power permitted to act in a contrary direction without restraint, the decomposition of the material world would ensue.

NOTE V.—p. 108.

I do not consider the mind as an assemblage of powers or of ideas, but as an unknown essence, *possessing* powers, and perceiving the impressions made upon it: in like manner, as matter is not an assemblage of properties, but a substance *possessing* properties and qualities, which, I will here observe, are quite opposite to those exhibited by the immaterial principle—a sufficient reason, among many others, I should have thought, to have preserved us from materialism; for, if we give the name of matter to that which is tangible, inert, divisible, and cognizable to the senses, why give the same name, and consider as the same principle, that which is distinguished by possessing the *reverse* of these qualities? to that which differs from it in its *very essence*—i. e. in its existence of *solid* particles, by which solidity it can produce a concussion on the senses that reaches the mind, and there makes its presence known? Why, may it be said, cannot the qualities that we ascribe to spirit be *superadded* to matter? But how are we to *superadd* qualities which are of a contrary kind—activity to inertness, for instance? How are we to add

* Even the sun's rays must combine with our atmosphere (query—Is it with the *electricity* of our atmosphere?) to produce solar heat.

the power of commencing a movement to the incapability of moving without an impuse, which impulse must at last be traced to an independent power—and this power, which can overcome the inertness of matter, can it belong to an inert substance?

Note VI.—p. 172.

I shall illustrate this part of my subject by an anecdote, which, I believe, is well authenticated, and which invests the canine species with senses even beyond what *I* would have admitted. A gentleman of Whitmore, in Staffordshire, used to go twice a-year to London, and being fond of exercise, generally went on horseback, accompanied most part of the way by a faithful little terrier dog, which, lest he might lose it in London, he always left to the care of Mrs. Langford, his landlady at St. Albans, and on his return he was sure to find his little companion well taken care of. The gentleman calling one time as usual, for his dog, Mrs. Langford appeared before him with a woeful countenance, and said, "Alas, Sir, your terrier is lost! Our great house-dog and he had a quarrel, and the poor terrier was so bitten before we could part them, that I thought he never would have got the better of it. But he crawled out of the yard, and nobody saw him for almost a week. He then returned, and brought with him a dog bigger by far than ours, and they both togegether fell on our dog, and bit him so unmercifully, that he has scarcely since been able to go about the yard, or to eat his meat. Your dog and his companion then went away, and have never since been seen at St. Albans." The gentleman endeavoured to bear his loss as well as he could. On his arrival, however, at

Whitmore, he found his terrier, and, on inquiry into the circumstances, was informed that the animal had been at Whitmore, and had coaxed away the great dog, who, it seems, had in consequence followed him to St. Albans, and completely avenged his injury. There is said to be now living in St. Albans one of the inn servants who has a perfect recollection of this curious fact. It seems, therefore, that these animals have the power of communicating their ideas to each other. I have heard it quoted from a metaphysical writer, that "they can also make syllogisms; for if a dog loses sight of his master, and follows him by scent till the road branches into three, he smells at the first and at the second, and then, without smelling further, gallops along the third." But they sometimes display a reach of intellect beyond this, according to the same author: "Dogs," he says, "have a sense of time so as to count the days of the week. His grandfather had one which trudged two miles every Saturday to market to cater for himself in the shambles." He mentions a more extraordinary, but well authenticated fact. "A dog which had belonged to an Irishman, and was sold by him in England, would never touch a morsel of food upon a Friday. The dog would never forsake the sick bed of his master, and, when he was dead, refused to eat, and died also." Their feelings, however, none dispute.

THE END.

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